



Munich Personal RePEc Archive

The Competitiveness of Turkey with Respect to the Slovak Republic for the 1995-1999 Period

Ahmet Faruk Aysan and Yavuz Selim Hacıhasanoğlu

2007

Online at <http://mpa.ub.uni-muenchen.de/5496/>
MPRA Paper No. 5496, posted 30. October 2007

The Competitiveness of Turkey with Respect to the Slovak Republic for the 1995-1999 Period

Ahmet Faruk Aysan¹

Yavuz Selim Hacıhasanoğlu^{**}

Abstract

This paper examines Turkey's international cost competitiveness in manufacturing with respect to the Slovak Republic, and quantitatively investigates the relationship between Turkish cost competitiveness and the exports of manufactured goods at an industry level. The Relative Unit Labor Cost (RULC) measure and dynamic panel data techniques are employed for this analysis. We find that Turkey is not competitive with respect to Slovakia for the 1995-1999 period. The Competitiveness of Slovakia mainly depends on its relatively higher level of labor productivity.

JEL Classification: F14, F15

Keywords: Manufacturing export, competitiveness, relative unit labor cost, wage, productivity

¹ Ahmet Faruk Aysan, Department of Economics, Bogaziçi University, Istanbul 34342 Turkey
ahmet.aysan@boun.edu.tr

^{**} Yavuz Selim Hacıhasanoğlu, Department of Economics, Bogaziçi University, yshacihasanoglu@yahoo.com

The Competitiveness of Turkey With Respect to the Slovak Republic for the 1995-1999 Period

1. Introduction

During the 1960s and 1970s, Turkey was a fairly closed economy and adopted an import substitution industrialization strategy. This policy provided a process of rapid but unsustainable economic growth due to high government protection. In addition, Turkey confronted several external and internal shocks mainly because of the considerable rises in oil prices in this period. This led economic growth to slow down and the inflation rate to increase. Towards the end of the 1970s a stabilization and structural adjustment program was implemented because of a balance-of-payments crisis in this period. In January 1980, the government announced a program that intended to adopt an export-oriented industrialization strategy. The promotion of export, the liberalization of foreign trade regime, and the encouragement of private sector activities were the main objectives of the new strategy.

The integration of the Turkish economy with world markets and the promotion of export have been the main stimulus behind all governments' economic policy after this date. Within this context, the beginning of the 1980s can be considered as a turning point in the economic history of Turkey. Nevertheless, the 1990's were the lost decade for Turkey in economic terms. In addition to high inflation rates (80%) and depreciation of the exchange rate (100%) in the 1990s, GDP per capita in 2001 was almost the same GDP per capita as in 1993.

The implementation of reforms after trade liberalization in the early 1980s both stimulated private sector activity and improved the structural factors for international competitiveness. The private sector's share in manufacturing industry increased drastically

and the sectoral structure of exports altered considerably in favor of manufacturing products. Moreover, the composition of manufacturing export changed from low technology products to more technology intensive products. This led to strong export growth. In this period, the Turkish economy enjoyed an export-led growth. In the 1981-87 period, export revenues increased 15% per year on average. On the other hand, real exchange rate appreciation after 1988 caused a sharp increase in the real cost of labor. Export performance slowed down because of the appreciation of the Turkish currency after this year. This trend led the economy to become less competitive.

The holding of foreign currency deposits by Turkish citizens was allowed in 1984. The process of capital account liberalization which started in 1988 was completed before the end of 1989. Although the capital account liberalization in 1989 was another step towards the integration of the Turkish economy with world markets, it had a negative effect on export performance by causing the overvaluation of Turkish currency because of excessive borrowing. Uncontrolled financial liberalization in these years prepared the basis for the 1994 crisis. In the 1989-1994 period, the real exchange rate appreciation was no less than 20%. Hence, the increasing rate of export growth showed a relative slow down in the 1990s. High interest rates in addition to the appreciation of Turkish currency have been the main reasons for the short-term capital movements into Turkey. In this regard, the 1994 crisis was a “*hot money*” crisis. After the 1994 crisis, the devaluation of Turkish currency was more than 50% against the US dollar. The Central Bank lost half of its reserves, interest rates reached 400%, and the inflation rate climbed up three digit levels.

An incomplete Customs Union (CU) between Turkey and the EU was brought into existence on 1 January 1996 after Turkey’s application for EU membership in 1987. Excluding iron and steel products, unrestricted circulation of manufacturing goods and processed agricultural products were allowed between Turkey and the EU based on the CU.

The CU agreement included neither the agricultural nor services sectors. Besides elimination of the custom duties and charges and prohibition of the quantitative restrictions, Turkey agreed on the establishment of the common tariff of the EU with respect to third countries. This agreement led Turkey to face a sharp increase in competitive pressures that made it possible for many people to talk about the positive effects of the CU in the 1990s. The establishment of the CU did not initially lead to a considerable rise in the trade volume between Turkey and the EU. However, the reverse is true for after 2002².

The crises in Asia and Russia in 1997 and 1998, the two severe earthquakes taking place in the Marmara region in 1999 were certain global and domestic factors which affected the trade performance of Turkey after 1996. In addition, the crises in November 2000 and February 2001 adversely affected the economic conditions of Turkey. Because of these developments, Turkey faced with serious declines in import demands during 1999 and 2001.

Turkey's export performance needs to be investigated with a comparative view. Analyzing the trade dynamics of new EU members with respect to Turkey is useful to understand Turkey's integration process into the EU market in terms of international trade. Since Turkey is a developing country its relative position with respect to a developed one is not an interesting case. When Turkey's performance is compared to that of Middle Eastern and North African countries Turkey has the most competitive manufacturing industry³. On the other hand, when Turkey is to be compared with the new EU members and other newly industrialized countries the comparison becomes more interesting due to the common characteristics of these countries with Turkey.

The Czech Republic, Hungary, Poland and Slovakia became members of the EU in 2004. Turkey and these countries have almost the same characteristics. They all passed to more technological and skilled labor intensive sectors from the conventional ones. However,

² See Togan (2005) for the reasons of this fact.

³ See Albaladejo (2006) for detail.

in addition to data availability, an interesting integration case of Slovakia in the region has stimulated us to compare Turkey with the Slovak Republic. This paper primarily employs the relative unit labor cost (RULC) comparison to assess the competitiveness of Turkey with respect to Slovakia.

The integration of Slovakia to the global economy has gathered momentum over the last decade and the economy has transformed in the post-communist era. In the last six years, due to radical economic reforms Slovakia has become one of the fastest-growing economies in Europe. A 19 % flat tax rate reform and the structural changes were made in order to make the country a viable place for FDI. In the post-communist transformation period, Slovakia has attracted a large amount of foreign investment mainly in the manufacturing industry of automotive production. The automotive industry is the single most important manufacturing sector in the economy. In 1998, slightly more than 20% of total exports consisted of automotive industry while it reached 30% in 2006.

It is important to analyze the motivations behind automotive FDI in Slovakia. First, Czechoslovakia had the strongest tradition in car manufacturing among the CEE countries in the Communist era. Skoda, whose establishment dates back to the nineteenth century, was the first manufacturer of cars in this region. Hence, Czechoslovakia's tradition in automobile manufacturing is one of the most important factors in the flow of foreign investment in automotive production to Slovakia. Cheap, productive and skilled labor in Central Europe is another factor. For example, PricewaterhouseCoopers Automotive Institute research indicates that the labor cost advantage of Slovakia in the manufacturing sector as opposed to the German wage levels will remain considerable for several decades to come (PricewaterhouseCoopers 2007: 5). In addition, the lack of a tendency of the labor force to go on strike is another crucial factor in the labor market structure of Slovakia. Because of all these reasons Slovakia is an attractive country for the investors in automotive sector.

Since labor in the automotive sector is much more productive than in the other sectors in manufacturing, the development of the automotive sector affected the economy's overall labor productivity. The relative importance of the automotive industry is another important reason of the considerable effect of the productivity growth on the whole economy. In this respect, FDI becomes the prime engine in labor productivity growth. FDI has brought its new technology and forced domestic firms to compete in a more dynamic environment. Although many development economists consider FDI as an important channel for the transfer of technology to developing countries, Turkey's FDI inflows per capita are well below that of the Slovak Republic. In addition, most of the FDI goes to the service sector rather than to the manufacturing sector in Turkey. Limited FDI in Turkey flowed mainly to the manufacturing sector until the mid-1990s. However, the liberalization of the service sector substantially reversed this trend⁴.

In this paper, the comparison of Turkey with the Slovak Republic is conducted mainly in terms of labor costs in manufacturing. When we look at the details of the Turkish export data it is obvious that the driving force behind the export growth is manufacturing. The share of manufacturing export was 89% in 1995 and 90% in 1999. Since each sector would be affected differently from the economic events an analysis of export performance on a sectoral basis is necessary to investigate the dynamics of export.

The main objective of this study is then to investigate the relative cost and relative productivity dimensions of the production in the manufacturing sector. We analyze Turkish manufacturing exports by using a panel data of 2-digit Standard Industry Classification (ISIC) industries for the 1995-1999 period. In this context, the effects of productivity, wage, FDI and capacity utilization are explored. This type of analysis provides valuable information about the comparative advantage of each sector in terms of relative labor cost by including both the

⁴ See Albaladejo (2006) for detail.

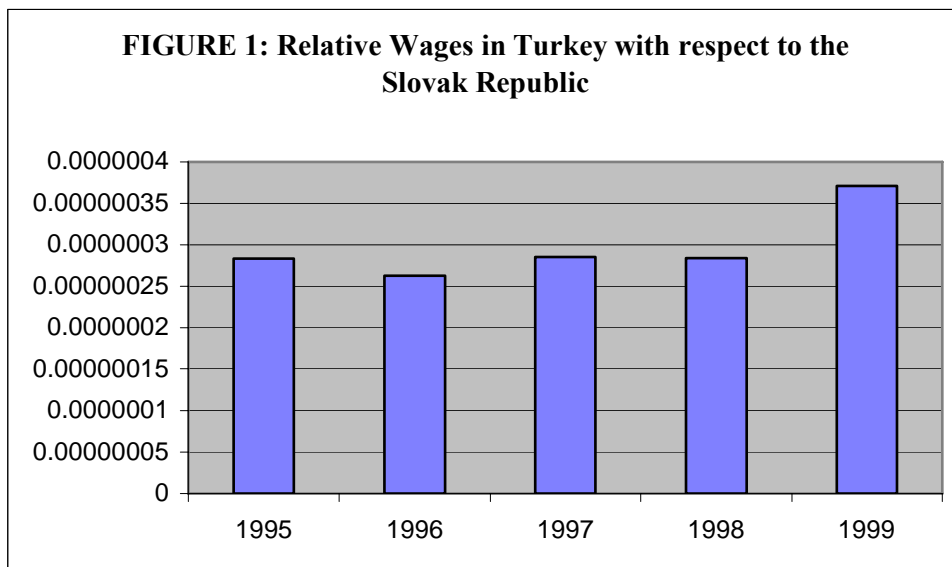
cost and productivity part of labor in production. Methodologically, we use the dynamic panel data technique for the analysis.

The remainder of this paper is organized as follows. The definition of RULC as a measure of international competitiveness is given in Section 2. In section 3, some recent studies regarding the competitiveness of Turkish exports are reviewed. The data sources, models for manufacturing exports and estimation results are discussed in Section 4. Finally, Section 5 concludes.

2. Unit Labor Costs as a Measure of International Competitiveness

In this section, we look at the relative wage and relative productivity of Turkey with respect to Slovakia for the 1995-1999 period. Figure 1 shows the relative dollar-based wages per production worker in the total manufacturing industry⁵. As it can be observed in the figure, there is no permanent rise or decline in relative wages for the whole period. However, when we look at the first and last years of the period, we see that Turkey has shown a tendency of increasing wage levels in manufacturing.

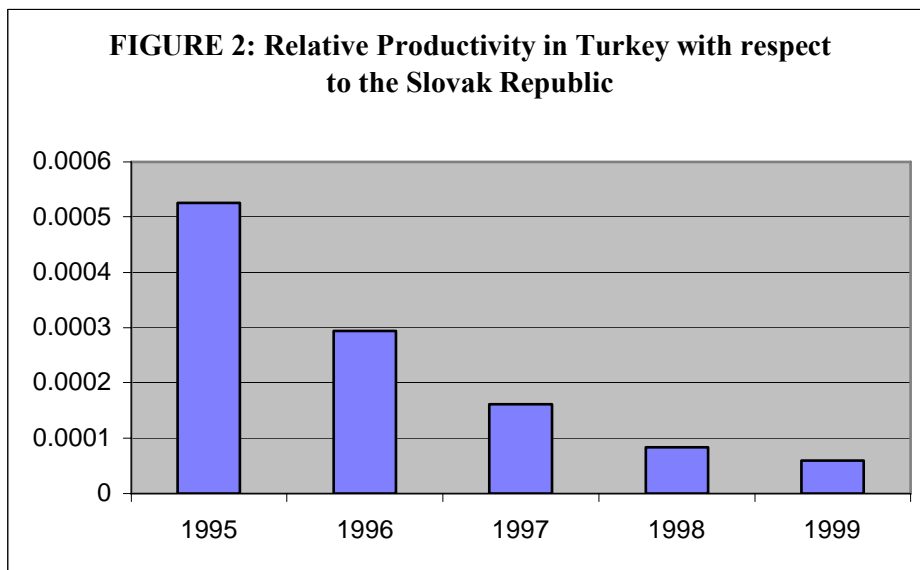
⁵ Relative wage is calculated by dividing the dollar-based wage of Turkey to that of Slovakia.



Source: Wages for Turkey are from TURKSTAT and wages for Slovakia are from OECD Stan database, exchange rates are from World Development Indicators and SIMA database of the World Bank.

Another important factor in the labor market is the changes in relative labor productivity in the manufacturing sector for the 1995-1999 period⁶. Productivity is calculated by dividing the production of each sector to number of employees in that sector. Relative productivity per worker in the total manufacturing sector can be seen in Figure 2. It is obvious that there is a continuous decline in relative labor productivity for Turkey in this period

⁶ Relative productivity is calculated by dividing the PPP-adjusted productivity of Turkey to that of Slovakia.



Source: Productivity for Turkey is from TURKSTAT and productivity for Slovakia is from OECD Stan database, PPPs are from World Development Indicators and SIMA database of the World Bank.

Comparing wages per worker in the manufacturing industry is not an appropriate criterion to conduct a labor cost competitiveness determination between Turkey and Slovakia. While nominal wage levels incorporate exchange rate effects they exclude the purchasing power parity (PPP) factor. However, this is a crucial consideration when comparing the competitiveness of a country in an international context. Moreover, unit labor cost (ULC) which is equal to the ratio of wages to labor productivity covers both of the factors stated above. The ULC measure takes both the wage and productivity changes into consideration simultaneously.

In this paper, we calculate relative unit labor cost (RULC) rather than wage rates in each manufacturing sector for two countries. Turner and Van't Duck (1993) and Turner and Golub's (1997) survey of the literature reach the conclusion that the RULC is the best single indicator of competitiveness in the manufacturing sector. In addition, as argued by Turner and Golub (1997), "in a world where capital is mobile and production is footloose between countries, it is the relative price of non-tradable *inputs*, notably labor, rather than *outputs* that matters." Because of the lack of labor mobility in the international context, the RULC is the

most important cost element determining the international competitiveness of an industry. Moreover, since both Turkey and Slovakia are labor abundant countries it is reasonable to emphasize the labor side of the production. This approach is especially worthwhile in our case where labor costs are still an issue of contention.

As the most important measurement of international competitiveness, the ULC has been widely used for international comparisons of cost competitiveness. In the Key Indicators of the Labor Market (KILM) database, which is a multi-functional research tool of the International Labor Organization (ILO), the ULC is defined as “the cost of labor required to produce one unit of output in a particular industry, sector or the total economy”. In addition to its clear intuitive appeal, the ULC is defined as the ratio of labor compensation per unit of labor (measured as the wage per employed person or per hour worked) to the productivity of labor (measured as output per employed person or per hour) as follows:

$$ULC^{D(U)} = [LCH^{DD} / ER^{DU}] / [OH^{D(D)} / PPP^{DU}] \quad (1)$$

where $ULC^{D(U)}$ is unit labor cost of country D in terms of dollars, ER^{DU} is the exchange rate between country D and the United States, PPP^{DU} is the purchasing power parity between country D and the United States, LCH^{DD} is the wage per hour in country D in prices of D and $OH^{D(D)}$ is the output per hour in country D in prices of country D.

Equation (1) states that countries with a low level of ULC relative to other countries are considered as cost competitive. The ratio shows that a country can stimulate its cost competitiveness either by decreasing its wage level (the numerator) or by raising the labor productivity (the denominator). In this respect, changes in ULC reflect the net effect of changes in wage level and labor productivity.

Calculation of the ULC indices is possible both in terms of the domestic currency basis and in US dollars (common currency). Since we are comparing Turkey with Slovakia

we convert wages to common currency by using the official exchange rate and labor productivity to common currency by using purchasing power parity. Note then that by construction, exchange rate is not used for the conversion of labor productivity in equation (1); because exchange rate fluctuations affect labor costs in a common currency but not the physical productivity of labor.

The RULC indicator for Turkey is calculated as ratio of ULC of Turkey and ULC of Slovakia:

$$\mathbf{RULC = ULC_{TR} / ULC_{SR}} \quad \mathbf{(2)}$$

where ULC_{TR} is the ULC of Turkey and ULC_{SR} is the ULC of Slovakia.

Relative unit labor cost (RULC) is the key relative price in the Ricardian model. A rise in RULC is interpreted as a decrease in the competitiveness of Turkey and a decrease of relative labor costs is interpreted as an increase of the competitiveness of Turkey compared to Slovakia. It is worth emphasizing that the equation can also be reversed with the ULC of Slovakia in the numerator and the ULC of Turkey in the denominator. In this case the rise and decline in RULC is interpreted oppositely.

Turkey's competitiveness with respect to Slovakia could improve if one of the following conditions holds: 1) Turkey's labor productivity increases relative to Slovakia, 2) wages in Turkey decline or 3) the Turkish currency depreciates. When the cost competitiveness of Turkey improves we expect exports to increase and import to decline for the relevant sectors. It is also worth remembering that while the competitiveness of each individual sector depends on the wages and productivity in that sector with respect to Slovakia, the exchange rate simultaneously affects all the sectors.

3. A Survey of Export Studies

In this section some recent studies regarding the competitiveness of Turkey and the export structure of the Slovak Republic are reviewed. Analyses of the international competitiveness of Turkey are unfortunately not widely available. Two types of competitiveness measures are used for Turkey. The first one is the revealed comparative advantage (RCA) measure (Yılmaz, 2003; Erlat and Erlat; Filiztekin, 2005; Kaya, 2006), and the second one is the unit labor cost (ULC) measure (Keyder, Sağlam and Öztürk, 2004; Aysan and Dinçsoy, 2006).

Yılmaz (2003) analyzes the competitiveness of Turkey with respect to Bulgaria, the Czech Republic, Hungary, Poland and Romania and the EU15 for the period between 1996 and 1999. He mainly employs the RCA index developed by Balassa (1965) for his analysis. The main emphasis is placed on the technological characteristics of the manufacturing sectors. He uses the Comparative Export Performance (CEP), Trade Overlap (TO), and Export Similarity (ES) approaches in addition to the RCA index. He concludes that Turkey and the five transition countries have a comparative advantage in exporting raw material intensive products. Within these six countries only Hungary has a comparative advantage in exporting easily imitable research-oriented products. Bulgaria and the Czech Republic are competitive in capital-intensive products. Only the Czech Republic and Hungary in comparison to the other four countries are trying to close the industrialization gap with the EU15. Turkey's export structure is similar to Romania, Poland and partly Bulgaria, indicating that Turkey has a comparative advantage in raw material and labor intensive products and has comparative disadvantages in the difficultly imitable research oriented products and in the easily imitable research- oriented products.

Erlat and Erlat examine the comparative advantage of Turkish export with respect to the European Union market for the 1990-2000 period. In their study, they analyze the RCA performance of Turkey's 3-digit exporting sector with regard to EU15. They use two different

classifications of sectors. The first classification of data depends on the *traditionality index*. This index discriminates sectors that exhibit a high export accomplishment at the beginning of a given period (traditional sectors) and those that show such an accomplishment towards the end of the period (non-traditional sectors). The second classification is based on the technological nature of the sectors. This classification includes *Raw material-intensive goods*, *Labor intensive goods*, *Capital-intensive goods*, *Easy-to-imitate research-intensive goods*, and *Difficult-to-imitate research-intensive goods*. Their findings indicate that when the technological categories of the sectors are taken into account; five countries (Belgium, Denmark, Finland, Greece and Spain) show a similar pattern with Turkey. However, when the shares in actual exports are concerned, only Belgium shows a similar pattern with Turkey. Another conclusion is that when the traditionality dimension is introduced, the traditional sectors are dominant. Nevertheless, shares of the traditional sector are decreasing while the shares of non-traditional sectors are rising. In addition, Raw Material Intensive Goods is the dominant category for the traditional sectors and Labor Intensive Goods is the dominant category for nontraditional sectors. Labor Intensive Goods is the dominant category in both cases if export shares are considered.

Filiztekin (2005) analyzes the changes in the comparative advantage of industries in the Middle Eastern and North African (MENA) countries relative to the EU members and selects developing countries covering the period 1991-2003. This paper uses RCA across industries for this analysis and shows that MENA countries have a comparative advantage mostly in lower technology sectors, agriculture, raw material and traditional industries. In contrast to MENA countries Turkey has a lower specialization. In this respect Turkey's structure is similar to that of non-EU countries. His findings also indicate that the evidence partly supports endogenous growth and new economic geography models.

The purpose of Kaya (2006) is to determine the Turkish manufacturing sectors that have a comparative advantage in export with respect to EU15 and EU10 and the countries such as Bulgaria and Romania. First, Turkish export specialization value is calculated in SITC Rev 3 classification by using the Balassa index over the period 1991-2003. Then, Turkish industries that have a comparative advantage are determined in accordance with SITC classification. His findings show that Turkey is specialized in labor intensive goods, and easy-to-imitate research-intensive goods.

There are two important deficiencies of the RCA index. First, since an industry which is competitive at a point in time does not always remain competitive, the RCA index does not take the dynamic comparative advantage into consideration. Second, the RCA index cannot measure the deriving factors behind competitiveness.

Keyder, Sağlam and Öztürk (2004) employ the unit labor cost (ULC) based competitiveness index rather than the RCA index for the whole manufacturing sector in order to compare Turkey with its 15 main trading partner countries covering the 1994-2003 period. While the unit labor cost index calculated for Turkey is lower than those of its trading partners, the ULC based competitiveness index indicates a significant cost based advantage for Turkey, particularly after the February 2001 crisis. Higher relative productivity and lower relative dollar based wages with respect to its trading partners lead to lower unit labor costs in Turkey. This provides a competitive advantage to Turkey. For the relevant period, the overvaluation of the Turkish currency is compensated by the reduction in ULC. Another important finding is that higher growth rates of output did not affect employment because of the rise in productivity. One of the most important deficiencies of the paper is that instead of using an econometric model for the analysis, their findings depend on the simple percentage change in the wage, productivity and ULC for Turkey and its trading partners. Second, their analysis is not a sectoral one. This tends to hide much of the variation at the sectoral level.

However, since the economic events affect each sector differently and an aggregate trade analysis hides the dynamics at the sectoral level, a sectoral analysis of export performance is required to examine the structure of the export. Hence, we use an econometric model with a sub-sectoral manufacturing data.

Finally, Aysan and Dinçsoy (2006) investigate the competitiveness of Turkey in the manufacturing sector by using the ULC comparison with respect to the transition countries including Poland, Hungary, the Czech Republic and Slovakia. In contrast to the pure wage rate comparison, Turkey exhibits a better performance from the countries in the sample with regard to ULC. In addition to this main result, the paper also examines the ULC for the rising and declining sectors in the manufacturing sector. The most important drawback of this paper is that it does not employ any econometric model for the analysis.

A report by Jakubiak and Kolesar investigates the recent investment in the automotive industry and analyzes how the economy's overall productivity and growth has been influenced by the developments in the automotive sector in Slovakia. Since the country has changed its position from a relatively backward one to the transition frontrunners, the case of Slovakia is interesting. The authors conclude that reforms and liberalization are the two crucial factors in attracting automotive investments to Slovakia. Factor endowments and current industrial policies have also played a role. After the initiation of the investment projects they had a significant impact on the growth of exports and employment. It is estimated that the automotive industry is to increase its production three times in the next two years.

It has been argued in the 2005 Economic Survey of the Slovak Republic that “sound macroeconomic policy, assertive product, capital and labour market liberalisation, and fundamental tax and welfare reform have transformed the Slovak business environment in recent years.” In addition, FDI became the driving force behind capacity and productivity

growth. This causes the economy to follow a strong and well-balanced growth path. On the other hand, unemployment is still high and economic activities in the non-tradable sector are underdeveloped and less productive.

Altzinger (1998) assesses Austria's investment activities in the Central and Eastern European Countries (CEECs). Since 1989 Austria's investment in these countries (Hungary, the Czech Republic, Slovakia, Slovenia) has intensified. In 1995, 91.1% of Austria's overall FDI went to its four adjacent countries, Hungary, the Czech Republic, Slovenia and Slovakia. Geographical proximity and close historical and cultural ties are the two important reasons why even small and medium-sized Austrian companies invest in these countries. Particularly, in the core industrial sectors (metal products, mechanical products, electrical and electronic equipment), the main objective of these investments is the low labor cost. Although Austria's international financial capabilities are not very large its FDI-stock-share is 23.6% in Slovenia, 21.4% in Slovakia and 19.6% in Hungary. Based on these shares Austria is the first in Slovenia and Slovakia and second in Hungary (UN/ECE, 1996).

The purpose of Vagac, Palenik, Kvetan, and Krivanska's (2001) paper is to examine the effect of EU accession⁷ on the foreign trade performance of four Central and Eastern European (CEE) transition countries. These are the Slovak Republic, Hungary, Poland and the Czech Republic. Their simulation analysis concludes that the Slovak economy will become even more open indicating that domestic enterprises face additional pressure to cope with competition. Therefore, it is important to constitute a motivating business environment which will stimulate domestic production and enhance the competitiveness of Slovak exports in the pre-accession period. This should be done by not only through direct support to exporters in the form of loans and credits, but also by realizing the structural reforms to improve the business environment in Slovakia. Their analysis also indicates that accession to the EU will

⁷ Slovakia was a candidate country in 2001. It became an EU-member in 2004.

not considerably change the trade balance of the Slovak Republic. They expect an additional increase of FDI inflow especially in the manufacturing industry after EU accession.

Based on the above mentioned studies and others the automobile industry is becoming a driving force of economic development in the Czech Republic, Hungary, Poland, and the Slovak Republic. This paper examines Turkey's international cost competitiveness in manufacturing, particularly with respect to labor costs, and investigates the quantitative relationships between Turkish cost competitiveness and exports of manufactured goods at an industry level. The key question is whether Turkey is competitive with respect to the Slovak Republic. The paper extends the ULC papers on the competitiveness of Turkey in two dimensions. First, to the best of our knowledge, an econometric analysis of ULC in Turkey at the sectoral level has not been employed before. Second, this is the first study investigating the competitiveness of Turkish manufacturing exports with a dynamic panel data model.

4. Empirical Model

In this section we investigate the evolution of the comparative advantage of industries in Turkey in comparison to the Slovak Republic for the 1995-1999 period. Export performance is measured by the ability of domestic firms to compete in the international market. Various factors such as productivity, wages, technological innovation, foreign direct investment (FDI) and exchange rates affect the export performance of an industry. In this study, emphasis will be placed on the cost competition particularly with respect to labor costs. As argued by Turner and Golub (1997), "in a world where capital is mobile and production is footloose between countries, it is the relative price of non-tradable *inputs*, notably labor, rather than *outputs* that matters." Because of the lack of labor mobility in the international context, the RULC is the most important cost element determining the international

competitiveness of an industry. In addition, since both Turkey and the Slovak Republic are labor abundant countries it is reasonable to emphasize the labor side of the production. This approach is especially worthwhile in our case where labor costs are still an issue of contention.

In this study, we use sectoral export, wages, labor productivity⁸ and capacity utilization data for the manufacturing industry. The data covers the time period of 1995 to 1999. We analyzed the competitiveness of Turkish exports on a two-digit level, based on the International Standard Industry Classification (ISIC). The data set related to the exports, wages, productivity and capacity utilization of the manufacturing sector for Turkey was obtained from the Turkish Statistical Foundation (TURKSTAT). On the other hand, the wage and productivity data for the Slovak Republic was obtained from the OECD Stan database. The exchange rate and PPPs for both countries are from the World Development Indicators and SIMA database of the World Bank.

We include world GDP in our model so as to measure the export growth that arises neither from productivity nor from price competitiveness but from the growth in the world economy. World GDP data is obtained from the Groningen Growth and Development Centre (GGDC) of the University of Groningen covering the total GDP of 129 countries in millions of 1990 US dollars.

In order to analyze the competitiveness of Turkish exports with respect to the Slovak Republic, we first run the following regression as a benchmark model.

$$X_{it} = \alpha + \beta_1 X_{i,t-1} + \beta_2 RULC_{it} + \beta_3 Y_{it} + \beta_4 CU + \epsilon_{it} \quad (3)$$

⁸ Productivity is calculated by dividing the production of each sector to the number of employees in that sector.

where i stands for sector and t stands for time period. The left hand side is the log of the volume of export. On the right-hand side $X_{i,t-1}$ is the log of the lag value of export, RULC is the log of the RULC which is obtained by dividing the ULC of Turkey to the ULC of Slovakia, Y is the log of the world GDP, and CU is the log of the capacity utilization. We expect the coefficient of RULC to be negative if Turkey is competitive with respect to Slovakia, and positive if the opposite is true. The expected sign of Y is positive. This means that growth in world GDP is expected to affect Turkey's export positively. The CU coefficient is expected to be negative.

In the second model we extend the first model by including the FDI. FDI data is taken from the Turkish Republic Prime Ministry Undersecretariat of Treasury.

$$X_{it} = \alpha + \beta_1 X_{i,t-1} + \beta_2 RULC_{it} + \beta_3 Y_{it} + \beta_4 CU + \beta_5 FDI + \epsilon \quad (4)$$

where FDI is the log of the foreign direct investment. The FDI coefficient is expected to be positive.

Finally in the third model, we decompose the RULC into its two components, relative wage and relative productivity.

$$X_{it} = \alpha + \beta_1 X_{i,t-1} + \beta_2 RelWage_{it} + \beta_3 RelProd_{it} + \beta_4 Y_{it} + \beta_5 CU + \beta_6 FDI + \epsilon_{it} \quad (5)$$

where $RelWage$ is the log of the relative wage, and $RelProd$ is the log of the relative labor productivity. The relative wage coefficient is expected to be negative while the relative productivity coefficient is expected to be positive if Turkey is more competitive with respect to Slovakia. Since the variables are in logs, the coefficients represent elasticities.

We estimated each equation using the dynamic panel data technique. This enables us to jointly consider variations over both the cross section and time series dimensions in a dynamic manner. One of the advantages of using panel data estimation is that it considers variations over both the cross-section and time series dimensions jointly. Secondly, panel data estimation improves coefficient estimates by increasing the power of the tests.

Following the Edwards and Golub (2004) paper, we included the lagged value of export as an explanatory variable as well as other explanatory variables in our estimations. If an econometric model contains the lag values of dependent variables as explanatory variable, then it has a dynamic character in nature. The OLS estimation technique cannot be used in a dynamic model. The first reason is that the *strict exogeneity of the regressors* assumption does not hold in this type of model. Second, the correlation between the right hand side of the regression equation and the disturbance term causes the OLS estimates to be biased upward and inconsistent. To solve these problems, dynamic panel data models require the use of the generalized method of moments (GMM) dynamic panel data technique developed by Arellano and Bond (1991)⁹.

Two variants of the Arellano-Bond estimators are one- and two-step GMM estimators. The one-step GMM estimator is efficient if the errors are homoscedastic and not correlated over time. The two-step estimator is efficient under more general conditions such as heteroscedasticity. Since the estimated standard errors of the two-step GMM estimator tend to be too small in small samples, Arellano and Bond recommend using one-step results for inference on coefficients. Hence, in practice, the asymptotic standard errors for the one-step estimator are more reliable for making inference in small samples.

When the error term at time t has some feedback on the subsequent realization of an explanatory variable then this explanatory variable is called predetermined variable. Since

⁹ See Baltagi (2001) for the details of the Arellano and Bond (2001) study and the other estimation techniques of dynamic panel data models.

unforecastable errors today might affect future changes in the RULC, relative wage, relative productivity, capacity utilization, and FDI, we might suspect that these variables are predetermined.

Table 1 shows that the empirical findings of our models depend on equations (3), (4) and (5). The *Sargan test*¹⁰ denotes the validity of the instruments in the sense that there is no correlation between the instruments and the errors in the first-differenced equation. In our models, the Sargan test fails to reject the null hypothesis that the over-identifying restrictions are valid in all cases. *Average autocovariance in residuals of order 1 is equal to 0* points out the first order autocorrelation in residuals while *average autocovariance in residuals of order 2¹¹ is equal to 0* points out the second order autocorrelation in residuals¹². The condition of no second-order autocorrelation is necessary for the validity of the GMM estimation. Our results verify that there is no second-order autocorrelation. Finally, the *Wald test* shows that all coefficients except the constant are zero. Based on the Wald test we reject the null hypothesis of joint non-significance in all cases at the 5-percent or 10-percent level.

In the first model, the coefficient of lagged export has the correct sign and it is significant. The RULC variable is significant and its coefficient has a positive sign indicating that the Slovak Republic is more competitive with respect to Turkey. The coefficients for world GDP and CU have the expected sign but they are both insignificant. The positive and insignificant coefficient of world GDP can be interpreted as such that Turkey's integration into the world economy is not complete yet.

In the second model, all variables have the expected signs and the new variable, FDI, has an expected sign but it is insignificant. Most of the FDI goes to the service sector in Turkey. The insignificance of this variable may stem from this phenomenon. Although many

¹⁰ The Sargan test is valid when $T \geq 4$.

¹¹ First and second order autocorrelations is valid when $T \geq 5$.

¹² First-order autocorrelation in the differenced residuals does not imply that the estimates are inconsistent, but the second-order autocorrelation would imply that the estimates are inconsistent.

development economists consider FDI as an important channel for the transfer of technology to developing countries, our model indicates that Turkey cannot benefit from this process. Finally, in the third model, all variables have the expected signs and the lag value of export and the relative productivity is statistically significant at 5%. This means that the competitiveness of Slovakia comes from the success of its relative productivity with respect to Turkey. Finally, the capacity utilization variable is significant at 10% in this model. This variable is included in order to test the “vent-for-surplus” hypothesis. We find a negative and significant coefficient for this variable indicating that the rise in exports is partly in response to declines in domestic demand and accompanied by low rates of capacity utilization.

Table 1: Labor Cost Competitiveness of Turkey with respect to the Slovak Republic

Dependant Variable Estimates	Model 1 LNEXPORT	Model 2 LNEXPORT	Model 3 LNEXPORT
Export_{t-1}	0.475*** (0.151) [0.002]	0.491*** (0.152) [0.001]	0.514*** (0.164) [0.002]
RULC	0.535*** (0.172) [0.002]	0.530*** (0.173) [0.002]	
Relative Wage			3722.484 (3065.772) [0.225]
Relative Productivity			-0.549*** (0.151) [0.000]
World income	0.605 (1.446) [0.676]	1.279 (1.757) [0.467]	2.326 (1.750) [0.184]
Capacity Utilization	-0.351 (0.399) [0.379]	-0.536 (0.505) [0.289]	-0.887* (0.457) [0.052]
Foreign Direct Investment		0.231 (0.344) [0.501]	0.135 (0.356) [0.704]
Constant	-0.330*** (0.118) [0.005]	-0.348*** (0.121) [0.004]	-0.324*** (0.088) [0.000]
Sargan test	chi2(21)=27.30 Prob>chi2=0.1613	chi2(29)=28.54 Prob>chi2=0.4893	chi2(37)=28.59 Prob>chi2=0.8377
1. order autocorrelation	z = -2.74 Pr > z = 0.0061	z = -2.70 Pr > z = 0.0069	z = -2.56 Pr > z = 0.0104
2. order autocorrelation	z = 0.10 Pr > z = 0.9202	z = 0.12 Pr > z = 0.9018	z = -0.11 Pr > z = 0.9153
Wald test	chi2(4)=16.35	chi2(5)=17.30	chi2(6)=27.79

Note: The first parenthesis below the estimated coefficients is standard errors and the second one is the Z statistics.

***, **, * indicate statistical significance at the 1 %, 5 % and 10% levels, respectively.

In order to determine the robustness of our analysis for different RULC calculations, we have estimated the RULC by excluding the PPP part with similar explanatory variables. Our results are robust to this alternative specification.

5. Conclusion

In this study, we have employed the dynamic panel data method to measure the competitiveness of Turkey with respect to the Slovak Republic in the manufacturing sector for the time period 1995-1999. The results indicate that Turkey is not competitive with respect to Slovakia and the relatively high performance of Slovakia is the result of its high relative productivity. In addition to this main result, the findings of the study also indicate that Turkey's integration into the world economy has not been completed yet.

Another interesting result obtained from our empirical analysis is that contraction in domestic demand after the 1994 crisis has partly had a positive effect on export growth. Finally, although many development economists consider FDI as an important channel for the transfer of technology to developing countries, our model indicates that FDI is not an important factor for the Turkish manufacturing industry for the relevant period. Since most of the FDI goes to service sector it does not have a significant effect on the manufacturing sector.

Although there are various problems such as low R&D activities, lack of specialized human capital, and lack of modern infrastructure in the manufacturing sector, this study shows that eventually low relative productivity is the most important factor in the poor performance of Turkey's competitiveness.

In spite of this gloomy picture, Turkey's potential for rising industrial competitiveness cannot be underestimated. It has a strategic location. Turkey is geographically close to the EU market, Central and Eastern European Countries, and Middle Eastern countries. It has a cheap and abundant labor and rich natural resources. However, unless the necessary reforms are implemented it is impossible to have a competitive manufacturing sector in Turkey.

To conclude, it can be said that RULC is the basic determinant of export and in order to obtain a sustainable and stabilized export growth public and private policy measures to induce productivity growth must be given priority.

References

- Albaladejo M., (2006), "The Manufacturing Sector in Turkey: Challenges for Structural change and convergence", unpublished paper prepared for Europe and Central Asia (ECA) Region Department of the World Bank as the background paper to Turkey's Investment Climate Assessment (ICA).
- Altzinger, W. (1998), "Structure and Objectives of Austria's Foreign Direct Investment in Four Adjacent Central and Eastern European Countries", *Paper presented at the 38th Congress of the European Regional Science Association Vienna, Austria, August 28 - September 1, 1998*
- Arellano, M., and O. Bover, (1995), "Another look at the instrumental-variable estimation of error-components models", *Review of Economic Studies*, 58, 277-97.
- Arellano, M., and S. Bond, (1991), "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations", *The Review of Economic Studies*, 58, 277-297.
- Van Ark B., and E. Monnikhof, (2000), "Productivity and unit labour cost comparisons: a data base"
- Aysan, A., and B. Dinçsoy, (2006), "Cost of Labor in Manufacturing Sectors of Turkey Compared with Other Transition Countries: Hungary, Poland, Czech Republic and Slovakia", *Boğaziçi University Research Papers*, ISS/EC 2007-04.
- Baltagi, B. H. (1995), "Econometric Analysis of Panel Data", *John Wiley & Sons*. New York
- Economic Survey of Slovak Republic (2005)
- Edwards, L. and S. Golub, (2004), "South Africa's International Cost Competitiveness and Productivity in Manufacturing", *World Development*, 32, 8: 1323-1339.
- Edwards, L., and S. Golub, (2002), "South Africa's international cost competitiveness and productivity: A sectoral analysis", Report prepared for the South African National Treasury under a USAID/Nathan Associates SEGA Project.
- Edwards, L., and P. Alves (2006), "South Africa's Export Performance: Determinants Of Export Supply" *South African Journal of Economics*, Vol. 74, 3 473-500.
- Erlat, G. and H. Erlat (2004a), "The Performance of Turkish Exports at the Sectoral Level, 1990-2000", Paper presented at the 24th Annual Conference of the Middle East Economic Association, San Diego, USA.
- Erlat, G., and H. Erlat "Do Turkish Exports Have Comparative Advantage With Respect To The European Union Market, 1990-2000" *mimeo Middle East Technical University*.
- Erzan, R., and A. Filiztekin, (1997), "Competitiveness of Turkish SMSEs in the Customs Union", *European Economic Review*, 41, 88 1-892.

- Fagerberg, J. (1988), "International Competitiveness," *The Economic Journal* 98 (June).
- Filiztekin, A. (2005), "The Evolution of Trade in MENA Countries", *mimeo paper presented in MEEA, ASSA Meetings*, Boston 2006.
- Golub, S. (1994), "Comparative advantage, exchange rates, and sectoral trade balances of major industrial countries", *IMF Staff Papers*, 41, June 1994.
- Golub, S., and A. Mbaye, (2003), "Unit Labor Costs, International Competitiveness, and Exports: the Case of Senegal", *Journal of African Economies*, No. 2, 2003.
- Golub, S. and C. Hsieh, (2000), "Classical Ricardian theory of comparative advantage revisited", *Review of International Economics*, 8, 2: 221-234.
- Golub, S., and J. Ceglowski, (2002), "South African real exchange rates and manufacturing competitiveness", *South African Journal of Economics*, 70 (6), 1047-1075.
- Golub, S. (2000), "South Africa's International Cost Competitiveness", *TIPS working paper*, 14.
- Hsiao, C. (2003), "Analysis of Panel Data", 2nd Edition. *Cambridge University Press, Cambridge*.
- ILO (1999), *Key Indicators of the Labour Market 1999*, "Chapter 6: Labour productivity and unit labour costs indicator, Geneva".
- Javorcik, B. S. (2004), "Does foreign direct investment increase the productivity of domestic firms? In search of spillovers through backward linkages", *American Economic Review* 94 (3): 605-627.
- Kaya, A. A. (2006), "İmalat Sanayi İhracatında Uzmanlaşma: Türkiye -Avrupa Birliği Analizi (1991-2003)"
- Keyder, N., Y. Sağlam, and M. K. Öztürk (2004), "International Competitiveness and the Unit Labor Cost Based Competitiveness Index", *METU Studies in Development*, 31 (June), 43-70.
- PricewaterhouseCoopers, (2007), "Eastern Influx: Automotive manufacturing in Central and Eastern Europe".
- Radosevic, S., and A. Rozeik, (2005), "Foreign Direct Investment and Restructuring in the Automotive Industry in Central and East Europe," *Working Paper No. 53*, SSEES, University College London.
- Smarzynska, B. K., (2002), "Does foreign direct investment increase the productivity of domestic firms : in search of spillovers through backward linkages", *Policy Research Working Paper Series 2923*, The World Bank.
- Sturgeon, T. and R. Florida, (1999), "The world that changed the machine: Globalization and jobs in the automotive industry," *A study by Carnegie Mellon University and the Massachusetts Institute of Technology*, Final report to the Alfred P. Sloan Foundation.

Togan, S. (1994), "Foreign Trade Regime and Trade Liberalization in Turkey During the 1980's", London: Avebury.

Togan, S. (2005) "Turkey: Trade Policy Review", *World Economy*, 28, 1229-1262.

Turner, P. and J. Van't dack, (1993), "Measuring International Price and Cost Competitiveness," *BIS Economic Papers* November, No.39: 1-149.

Vagac L., V. Palenik, V. Kvetan, and K. Krivanska, (2001) "Trade Effects Of EU Integration: The Case Of The Slovak Republic", *Phare ACE Research Project P97-8134-R*

Wawro, G. (2002), "Estimating Dynamic Panel Models in Political Science." *Political Analysis* 10: 25-48.