

International Competitiveness and the Unit Labor Cost Based Competitiveness Index^{*}

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Abstract

The paper attempts to estimate a unit labor cost based competitiveness index for Turkey. The trade weighted real effective exchange rate is the generally used measure of external competitiveness, which at times may fail to explain why a country's export performance improves despite its overvalued currency. When unit labor costs of Turkey and its trading partners are compared, it is seen that especially over the 1999-2003 period, Turkey's unit labor costs remained far below those of its trading partners and hence the unit labor cost based competitiveness index turned in favor of Turkey. Hence, during this period the overvaluation of the TL was more than compensated by the reduction in unit labor costs. Turkey, during the last few years experienced relatively higher growth rates which was export led and the outcome of increased productivity. This is why despite the growing output, employment was not affected.

^{*} Thanks are due to the anonymous referees for their most helpful comments.

1. Introduction

The purpose of the article is to estimate a *unit labor cost based competitiveness index* for Turkey, as an alternative to *trade weighted real effective exchange rate*, which is widely used as a measure of international competitiveness. In part two the relevant concepts used in the paper are given; such as, international competitiveness, overvaluation of the currency, purchasing power parity (PPP) hypothesis. Formulae used in real exchange rate estimations based on the PPP hypothesis are presented and the reasons for the failure of PPP hypothesis are listed. A literature survey related to unit cost based competitiveness takes place in part three. In part four, the quantitative background of the study is presented. Here, the procedure used in the determination of country weights and *unit labor cost based competitiveness index* is given. In part five, the results obtained in part four are evaluated. Part six is reserved for concluding remarks.

2. Concepts used in the paper

As mentioned earlier, the aim of the paper was to develop a measure of international competitiveness. What do we mean by international competitiveness?

The broad definition of international competitiveness, used by the OECD is: “the degree to which [a country] can, under free and fair market conditions, produce goods and services which meet the test of international markets, while simultaneously maintaining and expanding the real incomes of its people over time” (Boltho, 1996: 3). This is a significantly broader concept than ‘external competitiveness’, which may be improved by suitable exchange rate and subsidy policies, with the aim of increasing the country’s share in total world exports, and hence country’s standard of living.

The nominal exchange rate fails as a measure of competitiveness. Instead, the real effective exchange rate, which is defined as nominal exchange rate adjusted for the relative price levels of the countries in question, is a better measure. On the basis of the real exchange rate estimated, the currency of the country in question maybe said to be overvalued or undervalued. According to Frankel (1997) there may be six alternative meanings of over/under valuation:

1. Under/over valuation terms could refer to disequilibrium due to non-clearing of financial markets at which the supply of foreign exchange does not equal to demand.

2. Overvaluation could mean that a country’s private supply exceeds its private demand and the central bank supports the current value of the

currency at a higher rate than what it would be under a free float. This is often the case in a fixed or a managed exchange rate system.

3. Overvaluation could describe a currency with a value that is higher than determined by the long-run 'fundamentals', because it is determined by the short-run 'fundamentals' such as the sticky prices and real interest rate.

4. Overvaluation could mean that speculators can expect to make profit by selling the currency forward. This is the possibility of expectational errors often due to 'adaptive' expectations.

5. Overvaluation could mean that, even if the expectations are rational, the exchange rate diverges from the equilibrium determined by 'fundamentals', short-run as well as the long-run. This is the case of, for example, 'speculative bubbles'.

6. Overvaluation could pertain to the real effects of the exchange rate rather than to its determinants. That is, the loss of competitiveness by domestic exporting industries or importing competing industries may not be desirable.

To evaluate the effects of overvaluation and undervaluation on the international competitiveness of a country, one should take purchasing power parity (PPP) hypothesis into consideration. The PPP hypothesis postulates that exchange rates adjust to price differentials in open economies to restore the international commodity market equilibrium. In fact, the PPP hypothesis stems from the 'Law of One Price' (LOP), which states that measured in a common currency, freely traded identical commodities should have the same price everywhere in the absence of transaction and transportation costs (Burda and Wyplosz, 2001).

That is;

$$p_t = e_t + p_t^*$$

where e is the log of the nominal exchange rate (domestic currency / foreign currency), p is the log of the domestic price level, and p^* is the log of the foreign price level.

The PPP Hypothesis is given by;

$$e_t = p_t - p_t^*$$

Thus, the real effective exchange rate (REER) is as follows;

$$REER_t = e_t - (p_t - p_t^*)$$

Under the PPP Hypothesis, REER should be equal to 1. The deviations of REER from unity reflect the over/under valuation of the domestic currency with respect to the PPP condition. In this context, the PPP can be interpreted as a theory of exchange rate determination.

The PPP Hypothesis, however, is seldom supported by empirical evidence. The reasons behind the failure of the PPP Hypothesis are as follows:

Imperfect Competition: The PPP is based on the assumption that all the markets both in home and foreign countries are perfectly competitive. However, in reality, the level of market imperfection in different countries differs.

The Choice of Price Indices: The price indices (CPI and WPI) of different countries are not comparable, since the composition and weights used in the basket differ from country to country.

Non-tradable goods: The price indices include goods that are not traded (such as services). Thus, the PPP Hypothesis does not hold for these goods (e.g., under normal conditions, no one can be expected to travel to China, only to have a cheaper shoe-shine) in the least, due to transportation costs involved. The presence of trade barriers may also result in deviation from the PPP.

Non-Homogeneous Goods: The PPP may be expected to hold especially for internationally traded homogenous commodities, such as gold, agricultural products, oil, etc. Note that, even in the case of homogenous goods, the PPP may not always hold.

Pricing to Market: It may often be the case that firms sell the same product at different prices at different locations. This is called 'pricing to market'. Pricing to market reflects different demand conditions in different countries (or even in different regions in a single country/city). Market structures and different demand conditions may lead to different prices for the same product in different countries. This may cause the PPP not to hold.

Balassa-Samuelson Effect: Productivity differentials between countries may lead to differing price levels for the same products (Balassa, 1964: 584-596; Samuelson, 1964: 145-54). Lower labor productivity especially in non-tradable goods and/or lower wages in some countries may preclude the validity of the PPP as it compares aggregate price indices containing also non-tradables, etc.

When a currency is overvalued, there may be times when exports continue to perform at record high levels, as has been in the case of Turkey. In such cases PPP Hypothesis seems to fail as a measure of international competitiveness. Hence as an alternative, a measure of competitiveness based on unit labor costs is suggested. The index will be referred to as '*unit labor cost based competitiveness index (ULCBCI)*'.

3. Literature survey

This section discusses the importance of unit labor costs in international trade as an international competitiveness indicator and points out its advantages and disadvantages.

Globalization and increased international competition have made exports more responsive to relative prices and costs. Improved information and access to alternative suppliers is one of the factors responsible for this outcome.

What is implied by 'labor cost' or more specifically 'unit labor cost'?

Labor productivity and nominal wage are the two factors that affect unit labor cost. Productivity is defined as the gross product or value added per person employed or when data on working hours is available, per hour worked. Labor cost per unit of output (in short, *unit labor cost*) is defined as nominal labor compensation divided by real value added. Total labor compensation includes wage compensation and other labor costs such as employers' contributions to social security and pension schemes and labor cost of the self-employed (Monnikhof *et al.*, 1997: 1). The interpretation of unit labor cost is straightforward; it is the cost of worker compensation and benefits per unit of manufactured output. Unit labor costs rise when compensation and benefits rise faster than labor productivity. If labor productivity increases while worker compensation remains unchanged, then unit labor costs decline, whereas, if labor productivity remains constant but worker compensation and benefits rise, then unit labor costs rise. Hence, changes in unit labor costs reflect the net effect of changes in worker compensation and worker productivity.

In the literature, there are different approaches used for the definition of labor costs. Abraham (2001: 1-2) argues that "(t)hree labor costs issues are of main concern to global companies". *Firstly*, firms are interested in the magnitude of the *total* labor cost differentials between countries. All other things equal, countries with higher labor costs is less attractive investment locations. All other things are usually not equal and that is why, as a *second factor*, *unit* labor costs matter. Unit labor cost indicators take into account productivity differentials in comparing labor costs. An increase implies that labor costs rise by more than productivity gains such that the competitive position of the company deteriorates. Hence, unit labor costs reflect the competitive (dis)advantage due to (higher) lower labor costs. Authors like Treffer (1993: 981) argue that labor cost differences between countries to a large extent reflect productivity differentials. This would imply that the competitive impact of international labor cost deviations is small. Labor cost comparisons by Hooper and Vrankovich (1997: 231-81) and by Turner and Van't Dack (1993) dispute this view. The *third* important issue concerns *convergence*

in labor costs. Convergence relates to the growth of labor costs over time. Firms that take advantage of lower labor costs want to know how long the labor cost advantage will last. If unit and total labor cost quickly converge to the levels in other countries, companies are less likely to base their investment decisions on labor cost conditions. Are labor cost advantages being eroded over time? The convergence process is slow and often partial. Convergence does not apply to all countries or to all time periods. Hence, cost-based advantages may in specific cases survive the short and sometimes even the medium run.

International price and cost competitiveness is an important determinant of trade flows. If Turkish competitiveness improves, foreign demand for Turkish products should rise as they become less expensive in foreign markets, while Turkish demand for imports would be expected to drop as the latter become more expensive for Turkish buyers. In addition, in a world of high capital mobility, cost-competitiveness may be a determinant of foreign direct investment flows. Footloose industries will tend to locate where unit costs of non-tradable inputs, particularly labor, are low.

Why ‘unit labor cost’ and not ‘unit cost’?

Costs of tradable inputs such as raw materials and capital are likely to be approximately equalized internationally. The most important non-tradable input is labor. Thus, as argued by Turner and Golub (1997: 2-8), unit labor costs could be a particularly useful indicator of cost competitiveness. Carlin, Glyn, and Reenen (1999: 28), on the other hand, emphasize the effect of the relative costs on export market shares. In their own words: “The elasticity between relative costs and export market shares is approximately -0.27. (It is also confirmed) that in the long-run proportionate changes in the components of relative unit labor costs (exchange rate, wages and labor productivity) have approximately the same effect on export market shares, although their short-run dynamics differ. Thus as an index of cost competitiveness, Unit Labor Cost Based Competitiveness Index has much to commend it.”

In connection to the advantages and disadvantages of unit labor cost based competitiveness indicators Turner and Golub (1997: 7) state:

Unit labor costs in manufacturing (labor cost per unit of output or equivalently labor cost divided by output per worker) capture a key underlying determinant of competitiveness in an important subset of traded goods. By focusing on costs rather than prices, unit labor costs avoid some of the endogeneity problems of the CPI and export price measures. Labor costs are less subject to exchange-rate effects than traded-goods prices. Unit labor costs have several limitations, however. First, data on labor productivity and labor compensation, both of which are needed to compute unit labor costs, are not always reliable and available on a timely basis.

Second, these measures are not widely available for services, which constitute a growing although still secondary component of international trade. Third, labor productivity may exhibit short-run counter-cyclical movements, as firms 'hoard' labor in recessions. This problem can be partially overcome by filtering. Fourth, unit labor costs ignore other costs of production, notably intermediate goods, non-labor taxes, and capital costs. Similarly, movements in unit labor costs may sometimes reflect factor substitution rather than changes in efficiency. For example, an increase in the capital stock may raise the productivity of labor and reduce unit labor costs without necessarily improving competitiveness, since capital now represents a higher share of unit costs. But to the extent that capital and intermediate goods are traded in international markets whereas labor remains largely immobile internationally, labor costs are likely to diverge much more across countries than other costs of production, and therefore play a disproportionately important role in competitiveness. Moreover, especially in the advanced economies and increasingly also in emerging market countries, manufactures constitute a large part of trade.

Moreover, in their comprehensive survey of competitiveness indicators Turner and Van't Dack (1993: 112) conclude that for industrial countries "relative unit labor costs in manufacturing is probably the best single indicator". International differences in labor costs are often significant in discussions regarding trade with developing countries. Industrial countries are often concerned about the alleged unfair competitive advantage of developing countries created by lower wages and labor standards. On the whole, competitiveness measures based on unit labor costs are particularly attractive if the focus is on emerging economies that are major exporters of manufactures.

The rest of the paper will focus on the derivation and evaluation of unit labor cost based competitiveness index (ULCBCI) for the case of Turkey.

4. Analysis

In this section the procedure followed in the estimation of the *Unit Labor Cost Based Competitiveness Index* (ULCBCI) will be given.

The variables of the model are as follows: (all the series used in the paper are expressed in index form, 1995 (average of 4 quarters) being the base year).

- | | | |
|-------|---|--|
| W_i | = | Nominal Wage (production workers' hourly wages in manufacturing industry (private); gross, excludes employer's social security contributions), in terms of domestic currency for country i . |
| E_i | = | Nominal Exchange Rate (buying rate) for country i ; (Domestic Currency / US \$). |

IP_i	=	Manufacturing Production (private) for country i .
CE_i	=	Production workers in manufacturing industry (private) of country i .
PR_i	=	Labor Productivity for country i .
$ULCDC_i$	=	Unit Labor Cost in terms of domestic currency for country i .
$ULC\$_i$	=	Unit Labor Cost in terms of US \$ for country i .
$FULC\$_$	=	Weighted Average of Foreign Unit Labor Cost of Turkey's 15 major trading partners in US \$ terms.
$ULCBCI$	=	Unit Labor Cost Based Competitiveness Index.

The nominal wage, nominal exchange rate, industrial production and employment data for the countries in question are obtained from the databases of the Central Bank of the Republic of Turkey (CBRT), State Institute of Statistics of Turkey (SIS), State Planning Organization of Turkey (SPO), Organization of Economic Cooperation and Development (OECD), International Labor Organization (ILO), and International Monetary Fund (IMF) (See Table A-6 in the Appendix.). The period under investigation is from 1991Q1 to 2003Q4 in the case of Turkey's ULC estimation. The rest of the analysis incorporating foreign ULC estimations is restricted to 1994Q1 to 2003Q4 period, due to data limitations.

The formulae used in estimations:

$$PR = (IP / CE) \quad (1)$$

$$ULC^{DC} = (W / PR) \quad (2)$$

$$ULC^{\$} = (ULC^{DC} / E) = [W / (PR * E)] \quad (3)$$

$$FULC^{\$} = \sum_{i=1}^{15} w_i * ULC^{\$}_i \quad (4)$$

$$ULCBCI = (FULC^{\$} / ULC^{\$}_{TURKEY}) \quad (5)$$

Equation (1) denotes the labor productivity index of the country in question. Equation (2) denotes the unit labor cost in terms of domestic currency. Equation (3) refers to the unit labor cost in US dollar terms. Equation (4) denotes the weighted average of the foreign unit labor costs of Turkey's 15 major trading partners in US dollar terms. Here, w is the weight used for each country. (The procedure used in the determination of weights is given in the following section.) Equation (5) denotes the 'Unit Labor Cost-Based Competitiveness Index' for Turkey, which is an

expression of *trade-weighted foreign unit labor costs relative to Turkey's unit labor costs* (both indices being in dollar terms). A surge in the index suggests an increase in the international competitiveness of Turkey, while a decrease denotes a fall.

It is worth reminding that all the variables used and estimated are expressed in index form (1995 average = 100). Also note that the change in the \$/Euro parity may create a measurement bias on the $ULC^{\$}$. However, this bias is eliminated when the $ULC^{\$}$ (foreign) is divided into $ULC^{\$}$ (Turkey) to arrive at the ULCBCI.

Determination of country weights:

The 2003 weights for Turkey's major trading partners are determined as follows: The arithmetic average of Turkey's imports and exports with each of its trading partners is calculated in dollar terms. The figures are listed in absolute terms from the highest to the lowest (countries without the required statistical data are left out; such as Saudi Arabia, China, Algeria, Iran and Israel) and Turkey's major trading partners are selected. The 15 countries chosen are: USA, Germany, UK, France, Italy, Spain, Belgium, the Netherlands, Austria, Sweden, Switzerland, Japan, Romania, Russian Federation and Ukraine. From 1999Q1 onwards, 7 of these countries, following their adoption of the Euro as their common currency, have been handled under a single organization, namely the European Monetary Union (EMU). The 15 major trading partners selected make up 64.3% of Turkey's total international trade value.

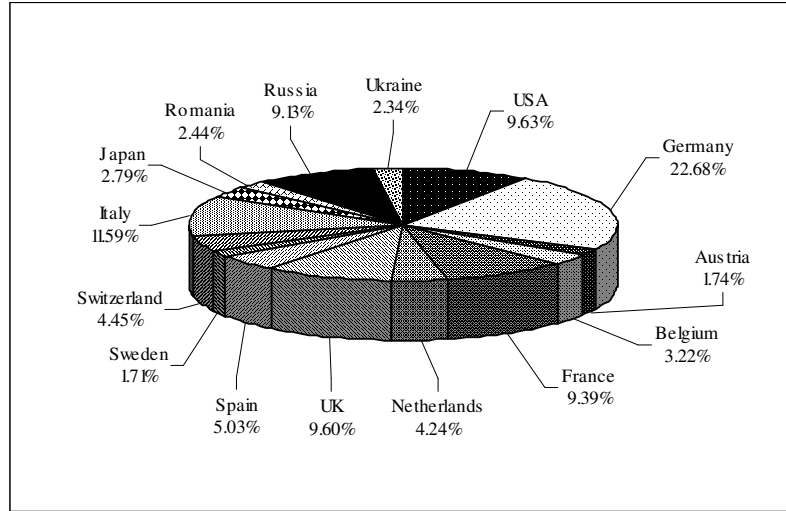
In the next step, the share of each country's foreign trade in the total export-import average of Turkey is estimated. Then the 64.3% coverage is equated to 100%, and by dividing each country's share into 64.3%, the relative shares (or weights, w) for the 15 trading partners are obtained. When the seven countries were merged under EMU following 1999Q1, EMU's share corresponded to 57.9% of Turkey's total trade value, when 64.3% was equated to 100% and the countries' relative shares were adapted to it (Figures 1 and 2).

5. Evaluation of the results

5.1. Unit labor cost in US \$ terms for Turkey and its major trading partners

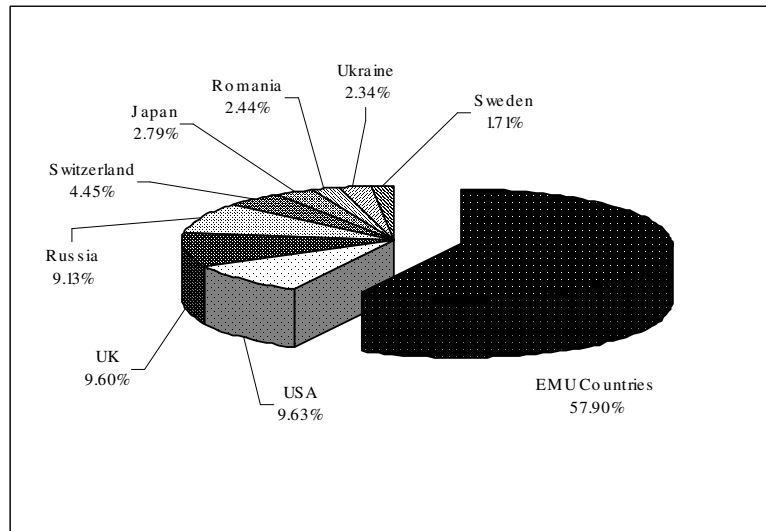
In general during an economic crisis, initially labor productivity declines and later it increases sharply. One explanation for such development could be that not all the unneeded people are laid off during busts (this is referred to as 'labor hoarding'). Hence during the bust, output declines sharply but employment reduction is not as sharp. So productivity decreases. As recovery starts, however, output increases

Figure 1
2003 Trade Weights -Turkey (% of \$ trade value)



Source: Our calculations based on data obtained from State Planning Organization of Turkey (Original Source: State Institute of Statistics of Turkey).

Figure 2
2003 Trade Weights -Turkey (% of \$ trade value)



Source: Our calculations based on data obtained from State Planning Organization of Turkey (Original Source: State Institute of Statistics of Turkey).

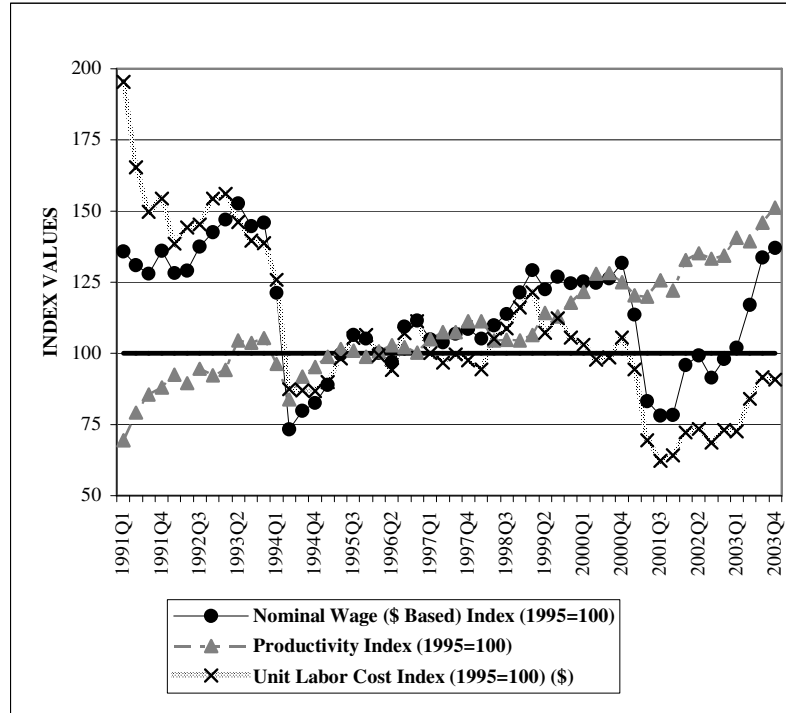
making use of the 'hoarded labor' therefore employment remains constant. This reflects as a productivity increase and a consequent ULC decrease.

Overall, because of increasing productivity and declining dollar based wages, Turkey's ULC^s follows a declining trend over the period under investigation. Especially, prior to 1994, 1999 and 2001 crises, there are substantial decreases in ULC^s, which may be explained by labor hoarding and substantial devaluation of the domestic currency during the crises. As recovery catches on, however, this trend is reversed, since output increases with no effect on employment. This development is best seen over the 2001 crisis. ULC^s reached its minimum value in 2001Q3 and then started rising again from 2001Q4 onwards. However, as of end-2003, it still remains below the 1995 base year value (100) as well as its pre-crisis level, which was around 105 (1995 = 100) (Table A-1 in the Appendix, Figure 3).

Turkey's ULC^s performance can be analyzed in three sub-periods. Prior to the 1994 crisis Turkey's ULC^s index lies above 100. However it follows a gradually declining trend. Turkey's ULC^s displays a sharp fall following both the 1994 and the 2001 crises. This is the consequence of major devaluations of April 1994 (50.9%) and February 2001 (33.4%). The ULC in dollar terms declines sharply at these times, since the nominal unit labor cost in domestic currency is converted into dollar terms using a higher exchange rate expressed in the form of domestic currency per dollar. The second sub-period chosen lies between 1994 and 2001. Turkey's and foreign ULC^s indices move close to each other in this period, both displaying smooth fluctuations with minor amplitudes around the base year value. The third sub-period covers the 2001Q1-2003Q4 period. Following the February 2001 major devaluation, the gap between the two series starts widening again. In Turkey, productivity shows immense increases as hoarded labor is put back to use, while wages in dollar terms remains almost constant. Hence over this period, Turkey's ULC^s declines and stays at levels considerably below 100. The foreign ULC^s, on the other hand, starts climbing and from 2002Q3 onwards, exceeds the base year value. By end-2003, the foreign ULC^s is 25% above the base year value (1995 = 100).

Looking at a few country-specific unit labor cost indices in dollar terms (Table A-3 in the Appendix) we see that in the case of USA, until the end of 2000, ULC^s moved around the 1995 base year value; however following 2000 a sharp and continuous increase is observed. The end-2003 index value stands at 115. Looking at ULC^s of UK, until 1997 it moves around 100 and starts to follow an increasing trend following 1997. The end-2003 ULC^s index value of UK is 153.51 (1995 = 100).

Figure 3
Dollar Based Nominal Wage, Productivity and ULC^s Indices for Turkey
(1995 Average = 100)

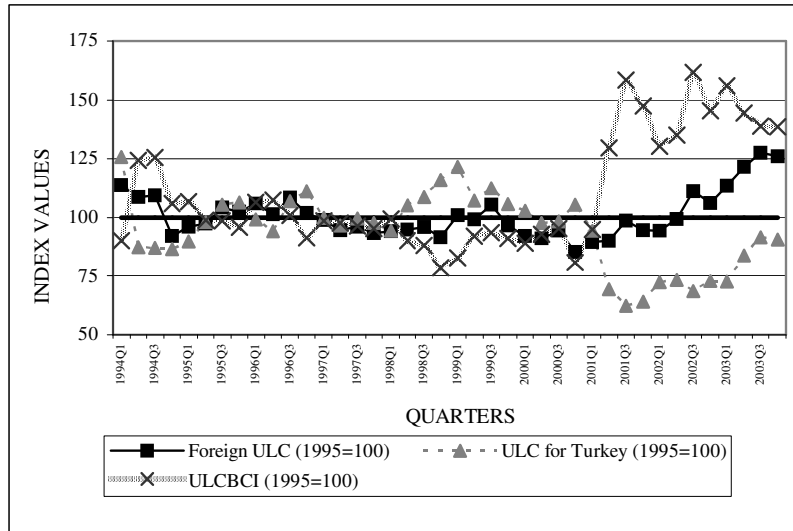


Source: Table A-1.

In the case of Russia, ULC^s is below its 1995 level between 1994Q1 and 1995Q3; but follows an increasing trend. Then it starts to show volatility between 110-160 (1995 = 100) and starts on its declining path following 1998Q2 and remains below the base year value from 1998Q4 until 2002Q2. The late 1990s correspond to the Russian crisis. The performance of ULC^s index during the crisis period in Russia is similar to that of Turkey. Like in Turkey, the crisis resulted in a huge decline in ULC^s of Russia followed by a sharp increase, which continued until end-2003. The Russian ULC^s index stands at 148 (1995 = 100) as of end-2003.

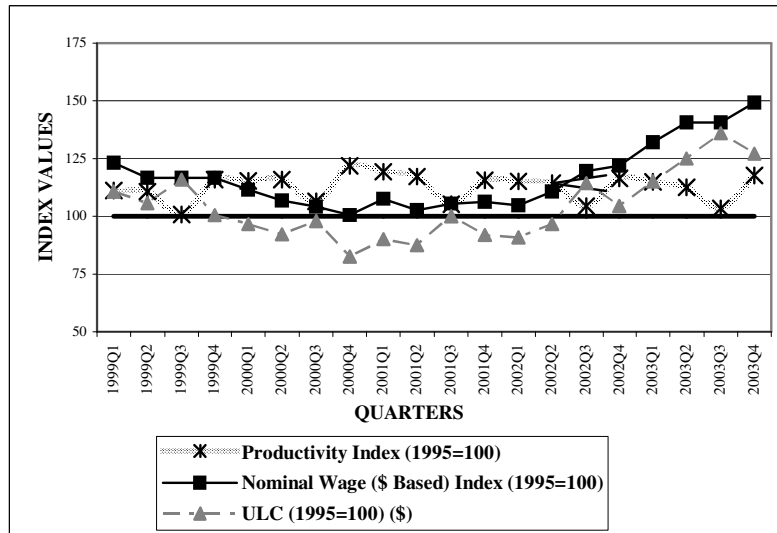
In the case of the ULC^s in the prospective EMU countries, prior to their adoption of the common currency (Table A-3 in the Appendix), we observe a structural similarity between Germany, Austria and France. Until 1998Q4, their ULC^s indices fluctuate smoothly around the base year value (1995 = 100), generally remaining below it. Also among the

Figure 4
 Turkish and Foreign ULC^s Comparison and the Unit Labor Cost Based Competitiveness Index (ULCBCI) (1995 Average = 100)



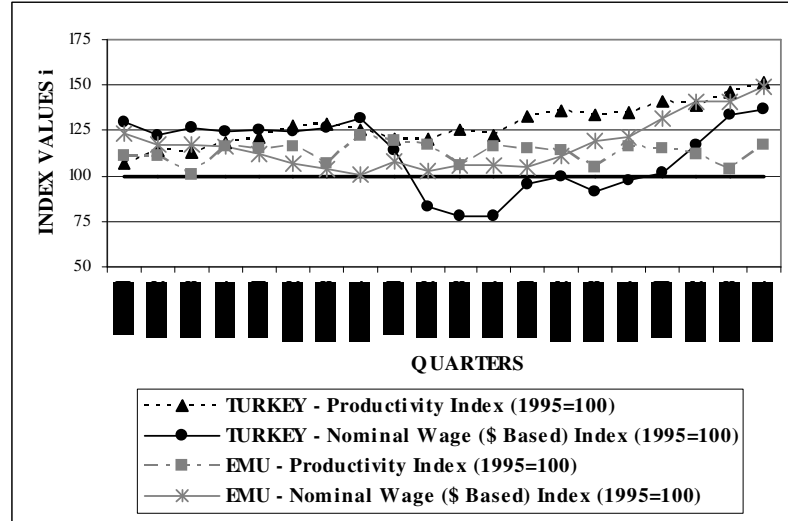
Source: Table A-2

Figure 5
 Dollar Based Nominal Wage, Productivity and ULC^s Indices for EMU Countries (1995 Average = 100)



Source: Table A-4.

Figure 6
Comparison of Turkey's & EMU's Productivity and Dollar Based
Nominal Wage Indices (1995 Average = 100)



Source: Tables A-1 and A-4.

rest of the EMU countries, namely Belgium, Netherlands, Spain and Italy there is some degree of similarity in the ULC^{\$} performance. Prior to 1998Q4 the ULC^{\$} indices in these countries are generally above the base year value. Following the adoption of Euro in 1999 the seven countries mentioned above are handled under a single roof, namely the EMU (Table A-4 in the Appendix, Figure 5). With regard to ULC^{\$} performance in the EMU, the 1999Q1-2003Q4 period can be divided into three sub-periods. Over the year 1999, ULC^{\$} is above the base year value. Between 2000Q1-2002Q2, ULC^{\$} falls below 100 and following the change in the Euro-Dollar parity in favor of Euro, from 2002Q3 onwards, ULC^{\$} rises above 100 and follows an increasing trend. The end-2003 index value is 127. As seen in Figure 6, Turkey's productivity index has been above that of EMU, whereas the dollar based wage index has been below that of EMU.

5.2. The Unit Labor Cost Based Competitiveness Index (ULCBCI)

The ULC based competitiveness index (Table A-2 in the Appendix, Figure 4), is obtained by dividing dollar based foreign ULC index by Turkey's dollar based ULC index. Over the 1994Q3-2001Q1 period, the index moves very close to the base year value. But starting from 2001Q1

on, there is a sharp and continuing improvement in Turkey's international competitiveness. The ULC based competitiveness index, in the average, lies around 30% above the base year value. As pointed out earlier, Turkey has achieved this cost advantage as a consequence of the relatively higher productivity and relatively lower dollar based wages, compared to that of its trading partners.

5.3 Unit Labor Cost Based Competitiveness Index (ULCBCI) and the Real Effective Exchange Rate (REER)

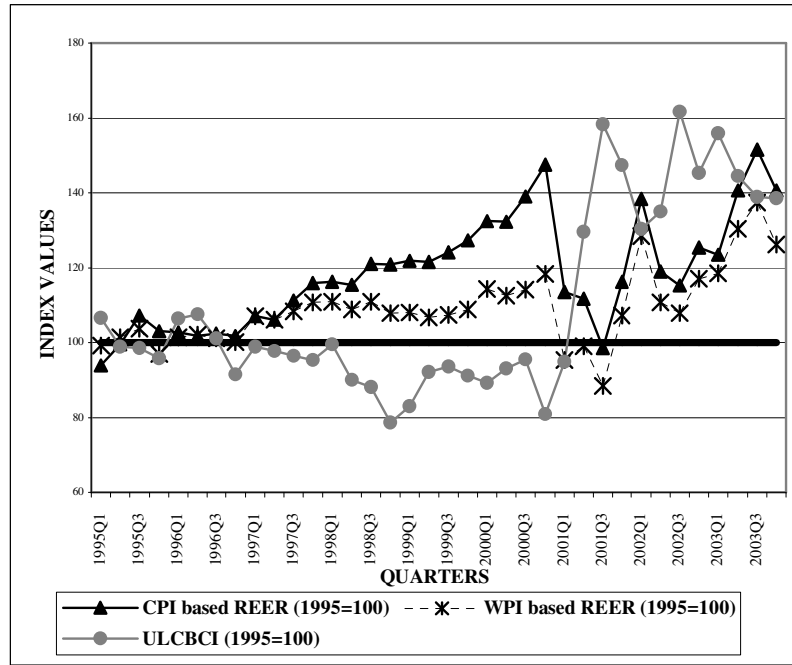
In this section, Unit Labor Cost Based Competitiveness Index (ULCBCI) is compared with the Real Effective Exchange Rate (REER) series compiled by the Central Bank of the Republic of Turkey (CBRT)¹. Both series' base year is 1995 (Table A-5 in the Appendix, Figure 7). Here the intention is to show that despite the overvalued TL (according to REER based on the Purchasing Power Parity Hypothesis); if there is a cost advantage in the country in question, its exports can still compete.

Note that an increase in the REER implies an appreciation of the TL, while a decrease in REER implies a depreciation of the TL. Here the appreciation of the TL is expected to have an adverse effect on exports, while TL's depreciation makes exports cheaper, hence more competitive. In the case of *unit labor cost based competitiveness index*, on the other hand, an increase denotes relatively cheaper per unit labor costs in Turkey, hence increased competitiveness of Turkey, while a decrease in ULCBCI denotes a decline in Turkey's competitiveness.

Until 1997, both the CPI and the WPI based REER are close to 100, however beginning 1997Q1, REER starts to follow an upward trend, which is reversed following the February 2001 devaluation. As a result of the devaluation and the continuing currency substitution, the CPI based REER decreased by 33.3% between 2000Q4 and 2001Q3. From 2001Q4 onwards, however it starts to increase again showing some degree of volatility. By end-2003 the CPI based REER shows 40, while the WPI based REER shows 26% overvaluation of the TL, compared to the base year value (1995 = 100). Looking at the cost side of the picture, comparison of the 1995 and the 2003 year-average values reveals that the dollar based ULC of Turkey has decreased by 15.3%, while that of

¹ CPI based real effective exchange rate index is calculated using the IMF weights for 19 countries including Germany, USA, Italy, France, United Kingdom, Japan, the Netherlands, Belgium, Switzerland, Austria, Spain, Canada, Korea, Sweden, Taiwan, Iran, Brazil, China and Greece. (1995 = 100). An increase in the index implies an appreciation. WPI based real effective exchange rate index is calculated using the IMF weights for 17 countries including Germany, USA, Italy, France, United Kingdom, Japan, the Netherlands, Belgium, Switzerland, Austria, Spain, Canada, Korea, Sweden, Iran, Brazil and Greece. (1995 = 100) An increase in the index implies an appreciation.

Figure 7
Unit Labor Cost Based Competitiveness Index (ULCBCI) vs. the Real Effective Exchange Rate (REER) (1995 Average = 100)



Source: Table A-5.

Turkey's trading partners has increased by 22.2%. As a result, Turkey's ULCBCI has increased by 44.5% over the period. Over the 1995-2003 period, with the exception of the 1996Q4-2001Q1 sub-period, Turkey, on unit labor cost basis, has been in an advantageous position. This explains why Turkey has had good export performance even at times when the TL was overvalued.

The post 1999 period carries more significance in connection to ULCBCI; hence this period will be magnified.

When the 1999 and the 2003 year-average values are compared, we see that, the Dollar based ULC of Turkey has decreased by 24.1%, while that of Turkey's trading partners has increased by 21.5% (Table A-2 in the Appendix, Figure 4). As a result of this development, Turkey's ULC based competitiveness index, which is estimated as 'ULC\$ (foreign)/ ULC\$ (Turkey)', has increased by 60.5% over the same period. In other words, between 1999-2003, Turkey's cost-based competitiveness has

increased. Major reasons behind this development are; (1) over 1999-2003, productivity in the industrial sector has increased by %27.8, while dollar based wages decreased by 2.6% (Table A-1 in the Appendix, Figure 3). Looking at the REER performance over the same period, we see that TL appreciated by 18.9% against foreign exchange when WPI based REER is used, and by 12.4% when CPI based REER is used. Despite the overvalued TL, in this period exports increased in an accelerated manner (rate of growth of exports was 4.5% in 2000, 12.8% in 2001, 15.1% in 2002 and 31% in 2003)². In sum, we can say that over the period 1999-2003, despite the overvaluation of the TL, exports continued to increase simply because the overvaluation in TL was more than compensated by the relatively lower per unit labor costs in Turkey, which was the outcome of increased productivity and relatively lower dollar based wages.

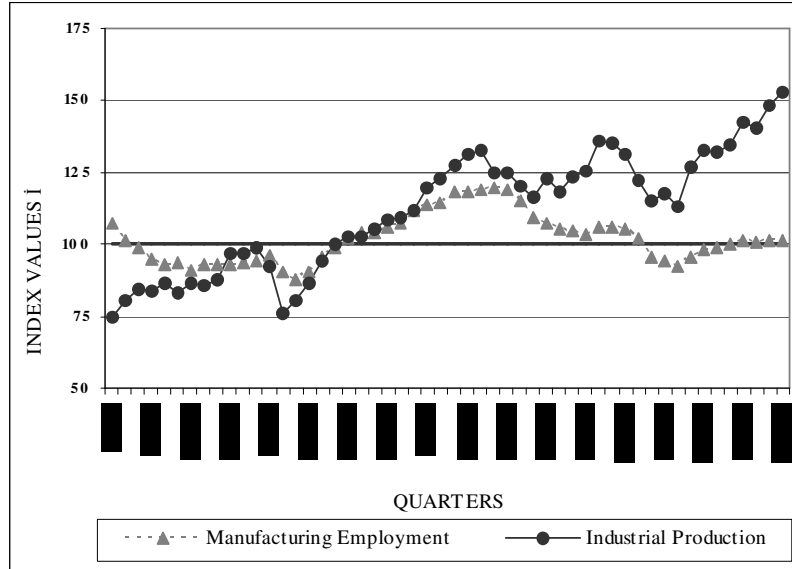
The restructuring in the public sector alone, has caused a 20.7% decrease in the blue collar employment, which was mainly responsible for the 34.5% increase in the productivity in the government sector.

The average productivity growth rate which was 3.8% in the 1990s, climbed up to 10% over the 2000-2003 period. The productivity increase is expected to lead to an increase in the potential income, which will contribute to easing the inflationary pressure in the country. The consequence of the potential income growth has shown itself in the surge of the average growth rate (in the 1990s the average growth rate was 4%, recently it is around 6-7%).

One last indirect observation that can be derived from the present analysis is that, in Turkey, since the start of the stabilization program in 2000, industrial output has increased by 21.3% but employment is still below its pre-crisis level (decreased by 5%) (Figure 8). The ULCS performance is implicitly reflecting this. The crisis is claimed to have taught the producer to produce more using less labor. This implies higher efficiency and possibly some degree of movement toward more capital intensive methods of production. The high output performance of the post 2000 period has been export led and productivity based, which has not contributed to any employment creation.

² ULC^S in Turkey's trading partners has been relatively higher. Despite this, however, Turkey's imports have also shown record high levels especially over 2002 and 2003. The growth rate of imports was 34% in 2000, -24% in 2001, 24.5% in 2002 and 34.5% in 2003. This was probably due to overvalued TL as well as increased demand for imports of intermediary and capital goods required by high growth rates.

Figure 8
Turkey's Industrial Production and Manufacturing Employment Indices
(1995 Average = 100)



Source: Table A-1.

6. Conclusion

The factors affecting international trade flows are relative prices and relative costs. For the measurement of international competitiveness, one should not rely solely on real effective exchange rate developments. Along with REER, relative costs should also be considered. In recent years Turkey has had record high levels of export performance despite the overvalued TL. This shows that REER may fail as a measure of international competitiveness at times. The unit labor cost based competitiveness index estimated for Turkey implies a large cost based advantage, especially after the February 2001 crisis. This advantage stems from relatively higher productivity and relatively lower dollar based wages in Turkey, compared to its trading partners, leading to lower unit labor costs in Turkey.

Even though unit labor cost based competitiveness indices have some drawbacks³, especially in the case of developing countries, they may be better measures of international competitiveness, since cost based

³ In the ULCBCI calculations, 2003 trade weights are assumed to be constant. However, trade composition and hence the weights used may change over time.

advantages of these countries are generally higher because of higher productivity and lower real wages.

In a globalized world, the cost-based competitiveness is a factor that affects foreign direct investment as well. Footloose industries tend to move to locations, where non-tradable factors of production (especially labor) have weak mobility and hence are cheap (like China).

In recent years the export-led, productivity based growth experienced in Turkey has not contributed to improvement in employment prospects. When the year average figures are compared, over the 1999-2003 period, even though output has increased by 21.3%, the employment level has decreased by 5%.

As a final word, we believe that further research on unit labor cost based competitiveness index computation is needed especially for developing countries such as Turkey. The results can be improved by inclusion of more trading partners. However, this will be feasible only when the prospective entries have the data set needed for the estimations.

References

- ABRAHAM, F. (2001), "Global and European Labor Costs", LICOS Center for Transition Economies, Licos Discussion Paper 102 / 2001.
- BALASSA, B. (1964), "The Purchasing Power Parity Doctrine: A Reappraisal", *Journal of Political Economy*, 72, 584-96.
- BOLTHO, A. (1996), "The Assessment: International Competitiveness", *Oxford Review of Economic Policy*, 12(3), 1-16.
- BURDA, M. C. and C. WYPLOSZ (2001), *Macroeconomics 3rd Edition*, Chapter 20, Oxford, UK: Oxford University Press.
- CARLIN, W., GLYN, A., and J. V. REENEN (1999), "Export Market Performance of OECD Countries: An Empirical Examination of the Role of Cost Competitiveness", Institute for Fiscal Studies and CEPR, Working Paper Series No. W99/21.
- Central Bank of Republic Turkey (CBRT) (Electronic Database, 2004)
- FRANKEL, J. (1997), "Six Possible Meanings of 'Overvaluation': The 1981-85 Dollar", in J. Frankel, *On Exchange Rates*, Ch. 6, Cambridge, MA: The MIT Press.
- HOOPER, P. M. and E. VRANKOVICH (1997), "International Comparisons of the Levels of Unit Labor Costs in Manufacturing", in Maskus, K., Hooper, P., Leamer, E. and J. D. Richardson (eds) *Quiet Pioneering: Robert M. Stern and his International Economic Legacy*. Ann Arbor: The University of Michigan Press.
- International Labor Organization (ILO) (2003), International Labor Statistics (ILS).
- International Monetary Fund (IMF) (2004), International Finance Statistics (IFS).

- MONNIKHOF, E. and B. VAN ARK (2000), “Productivity and Unit Labor Cost Comparisons: A Data Set”, International Labor Office, Employment Sector, Working Paper 2000 / 5.
- Organization for Economic Cooperation and Development (OECD) (2003) – Main Economic Indicators.
- SAMUELSON, P.A. (1964), “Theoretical Notes on Trade Problems”, *Review of Economics and Statistics*, 46, 145-54.
- State Planning Organization (SPO) (2004), *Main Economic Indicators*.
- TREFLER, D. (1993), “International Factor Price Differences: Leontief Was Right”, *Journal of Political Economy*, 101(6), 961-87.
- TURNER, A. G. and S. S. GOLUB (1997), “Towards a System of Multilateral Unit Labor Cost Based Indicators of Competitiveness for Industrial, Developing and Transitional Countries”, IMF Staff Studies for the World Economic Outlook, Working Paper No 97 / 151.
- TURNER, P. and J. VAN'T DACK (1993), “Measuring International Price and Cost Competitiveness”, Bank for International Settlements Economic Papers, No. 39.

APPENDIX

Table A-1
Data Used in the Calculation of the ULC for Turkey
(1995 Average = 100)

	Emp. (mfg)	Produc- tion (mfg)	Produc- tivity	Nom. Wage	ULC (TL)	ER (TL/\$)	ULC (\$)	Nom. Wage (\$)
1991Q1	107.14	74.47	69.50	9.51	13.68	7.05	195.31	135.72
1991Q2	101.62	80.46	79.17	11.36	14.34	8.72	165.35	130.89
1991Q3	98.80	84.42	85.44	12.56	14.70	9.87	149.73	127.91
1991Q4	95.06	83.73	88.08	14.64	16.62	10.83	154.32	135.91
1992Q1	93.10	86.16	92.54	15.87	17.15	12.45	138.50	128.15
1992Q2	93.29	83.47	89.47	18.72	20.92	14.60	144.13	128.93
1992Q3	91.26	86.39	94.66	21.26	22.45	15.54	145.27	137.48
1992Q4	93.28	86.13	92.34	24.86	26.91	17.53	154.37	142.52
1993Q1	92.79	87.44	94.24	28.97	30.73	19.81	156.02	147.02
1993Q2	92.76	96.91	104.48	33.21	31.78	21.87	146.11	152.63
1993Q3	93.49	96.83	103.57	36.38	35.12	25.29	139.63	144.59
1993Q4	93.99	98.98	105.31	42.32	40.17	29.13	138.66	146.01
1994Q1	95.92	92.44	96.36	47.09	48.85	39.05	125.81	121.22
1994Q2	90.65	76.04	83.89	51.64	61.54	70.90	87.29	73.21
1994Q3	87.92	80.68	91.77	56.00	61.00	70.48	87.04	79.87
1994Q4	90.57	86.19	95.17	65.01	68.29	79.22	86.69	82.48
1995Q1	95.53	94.32	98.74	79.11	80.10	89.58	89.92	88.77
1995Q2	98.63	100.24	101.63	92.75	91.23	93.47	98.15	99.74
1995Q3	101.95	102.89	100.93	107.01	105.99	101.11	105.42	106.38

Table A-1 (continued)

	Emp. (mfg)	Produc- tion (mfg)	Produc- tivity	Nom. Wage	ULC (TL)	ER (TL/\$)	ULC (\$)	Nom. Wage (\$)
1995Q4	103.90	102.55	98.70	121.13	122.68	115.84	106.51	105.11
1996Q1	104.36	105.16	100.77	139.70	138.59	140.38	99.28	100.03
1996Q2	105.77	108.83	102.89	160.87	156.30	166.81	94.23	96.93
1996Q3	107.20	109.52	102.17	203.22	198.85	186.80	107.05	109.36
1996Q4	111.72	111.93	100.19	239.73	239.20	216.12	111.30	111.50
1997Q1	113.90	119.44	104.86	269.90	257.30	258.76	100.00	104.84
1997Q2	114.59	123.02	107.36	310.08	288.71	300.23	96.71	103.81
1997Q3	118.52	127.30	107.41	376.98	350.87	354.35	99.58	106.94
1997Q4	118.11	131.47	111.32	444.17	398.88	411.05	97.59	108.62
1998Q1	119.33	132.86	111.34	510.06	457.96	487.86	94.40	105.09
1998Q2	119.53	124.83	104.43	603.34	577.55	552.00	105.22	109.86
1998Q3	118.92	124.60	104.77	673.96	643.06	594.96	108.69	113.86
1998Q4	115.00	120.19	104.52	773.21	739.56	640.69	116.08	121.31
1999Q1	109.33	116.25	106.33	959.01	901.66	746.39	121.48	129.15
1999Q2	107.44	122.62	114.14	1052.19	921.58	864.13	107.25	122.39
1999Q3	105.08	118.61	112.88	1208.18	1069.98	957.45	112.39	126.84
1999Q4	104.93	123.74	117.92	1344.63	1139.91	1085.29	105.63	124.54
2000Q1	103.17	125.42	121.57	1532.74	1260.39	1230.63	103.00	125.19
2000Q2	106.22	135.84	127.89	1655.71	1294.23	1332.93	97.65	124.86
2000Q3	105.74	135.60	128.24	1773.87	1382.81	1411.19	98.54	126.35
2000Q4	105.11	131.33	124.95	1947.19	1557.89	1485.03	105.50	131.80
2001Q1	101.77	122.56	120.43	1957.65	1625.06	1731.78	94.37	113.63
2001Q2	95.89	114.95	119.87	2133.41	1779.15	2579.04	69.37	83.15
2001Q3	93.96	118.02	125.60	2368.41	1885.00	3046.87	62.22	78.13
2001Q4	92.64	112.97	121.95	2592.95	2125.55	3330.92	64.17	78.25
2002Q1	95.29	126.60	132.86	2833.24	2131.76	2968.66	72.21	95.93
2002Q2	98.05	132.61	135.25	3040.68	2247.53	3077.84	73.44	99.30
2002Q3	99.12	132.09	133.26	3268.38	2451.75	3595.51	68.57	91.37
2002Q4	100.14	134.56	134.37	3437.48	2557.44	3525.32	72.96	98.01
2003Q1	101.11	142.13	140.57	3653.66	2598.35	3599.98	72.58	102.02
2003Q2	101.06	140.79	139.31	3845.94	2759.83	3306.79	83.93	116.91
2003Q3	101.51	148.02	145.82	4043.15	2771.75	3040.11	91.69	133.68
2003Q4	101.21	153.02	151.19	4305.17	2846.61	3155.58	90.72	137.14

Source: Our calculations based on data obtained from State Planning Organization of Turkey.

Table A-2
 Turkey's ULC^s, Foreign ULC^s and Unit Labor Cost Based
 Competitiveness Index (ULCBCI) (1995 Average = 100)

	ULC for Turkey	Foreign ULC	ULCBCI
1994Q1	125.81	113.81	90.24
1994Q2	87.29	108.78	124.31
1994Q3	87.04	109.57	125.58
1994Q4	86.69	92.16	106.06
1995Q1	89.92	96.11	106.61
1995Q2	98.15	97.33	98.92
1995Q3	105.42	104.17	98.57
1995Q4	106.51	102.39	95.90
1996Q1	99.28	105.98	106.48
1996Q2	94.23	101.56	107.52
1996Q3	107.05	108.46	101.07
1996Q4	111.30	102.01	91.43
1997Q1	100.00	99.06	98.81
1997Q2	96.71	94.71	97.69
1997Q3	99.58	96.28	96.45
1997Q4	97.59	93.32	95.39
1998Q1	94.40	94.23	99.57
1998Q2	105.22	95.02	90.08
1998Q3	108.69	96.02	88.12
1998Q4	116.08	91.57	78.69
1999Q1	121.48	101.01	82.94
1999Q2	107.25	99.10	92.17
1999Q3	112.39	105.50	93.64
1999Q4	105.63	96.62	91.24
2000Q1	103.00	92.11	89.20
2000Q2	97.65	91.05	93.02
2000Q3	98.54	94.32	95.48
2000Q4	105.50	85.51	80.85
2001Q1	94.37	89.71	94.83
2001Q2	69.37	90.09	129.54
2001Q3	62.22	98.77	158.37
2001Q4	64.17	94.79	147.35
2002Q1	72.21	94.37	130.36
2002Q2	73.44	99.45	135.08
2002Q3	68.57	111.13	161.66
2002Q4	72.96	106.32	145.37
2003Q1	72.58	113.39	155.83
2003Q2	83.93	121.56	144.47
2003Q3	91.69	127.65	138.87
2003Q4	90.72	126.04	138.59

Source: Our calculations based on data obtained from State Planning Organization of Turkey, OECD, International Labor Organization and IMF.

Table A-3
Country-Specific ULC^s Indices of Turkey's 15 Trading Partners
(1995 Average = 100)

	USA	UK	Russia	Germany	Austria	Belgium	France	Netherlands	Spain	Italy
1991Q1	99.36	104.06	0.66	73.39	75.61	148.51	83.06	155.98	101.38	127.86
1991Q2	101.48	101.52	2.91	65.42	64.83	64.70	76.00	71.47	91.62	117.02
1991Q3	100.49	103.11	3.20	70.72	73.05	55.17	86.50	60.91	111.96	147.45
1991Q4	100.81	100.48	3.63	69.62	70.98	84.52	78.66	84.08	109.89	131.89
1992Q1	100.40	102.19	7.15	72.21	77.75	132.12	81.19	138.63	100.84	130.37
1992Q2	101.66	111.67	12.59	74.18	75.26	75.29	86.19	84.32	104.68	131.75
1992Q3	101.11	118.63	18.63	89.44	97.19	79.80	107.85	87.82	138.96	180.96
1992Q4	100.25	91.24	19.73	80.91	82.90	106.33	87.31	104.90	116.74	121.36
1993Q1	99.27	86.57	21.30	83.51	83.52	168.23	87.55	168.96	99.33	104.15
1993Q2	101.88	95.61	28.57	86.79	84.41	102.52	90.47	110.46	95.81	108.44
1993Q3	101.57	95.76	49.47	86.69	89.53	83.40	96.71	89.86	104.39	129.92
1993Q4	102.31	87.93	71.74	80.01	79.31	117.90	81.89	118.00	95.64	101.81
1994Q1	101.10	88.94	87.92	82.11	84.78	141.39	82.95	144.86	80.87	97.44
1994Q2	101.02	92.51	100.36	83.81	85.85	77.93	84.64	80.82	82.49	97.81
1994Q3	100.85	99.15	108.68	92.33	99.41	71.07	102.15	70.49	102.70	121.29
1994Q4	101.77	95.33	87.49	85.01	86.04	82.67	87.48	75.70	96.33	98.08
1995Q1	99.22	95.64	71.33	94.89	96.86	143.03	91.22	141.97	85.38	94.34
1995Q2	100.32	102.79	85.09	101.44	99.52	83.39	99.71	88.32	91.69	91.61
1995Q3	99.63	104.26	111.87	103.78	106.58	72.88	111.98	74.42	112.67	115.98
1995Q4	100.82	97.31	131.71	99.90	97.04	100.70	97.09	95.29	110.26	98.06
1996Q1	100.11	95.86	128.94	100.45	100.62	177.48	96.75	165.96	99.92	100.14
1996Q2	100.74	102.62	143.61	96.77	94.70	78.88	97.64	80.46	98.41	103.32
1996Q3	100.32	108.11	143.15	100.14	101.30	71.90	109.53	73.11	119.28	131.98
1996Q4	101.29	106.38	140.87	92.33	88.41	84.93	93.03	83.17	112.91	111.74
1997Q1	99.29	108.42	130.25	87.46	87.55	136.69	90.05	136.90	90.95	101.37
1997Q2	99.88	113.74	145.92	84.07	81.01	64.92	86.24	69.11	87.50	95.59

Tablo A-3 continued

	USA	UK	Russia	Germany	Austria	Belgium	France	Netherlands	Spain	Italy
1997Q3	97.83	116.42	149.96	80.72	81.01	47.53	90.54	52.00	96.78	112.21
1997Q4	98.55	115.04	147.69	78.02	73.13	61.60	79.73	61.45	97.29	95.35
1998Q1	98.17	115.95	146.58	77.07	75.48	101.36	79.22	103.15	82.34	91.23
1998Q2	99.08	120.86	163.56	79.29	72.58	54.01	81.43	58.87	83.52	93.26
1998Q3	97.55	124.61	121.28	81.86	78.15	45.08	92.70	49.83	100.12	117.64
1998Q4	98.63	120.42	64.77	84.86	75.14	75.07	84.68	76.99	103.85	107.13
1999Q1	98.38	120.21	48.07							
1999Q2	99.24	123.41	55.71							
1999Q3	98.58	125.33	58.67							
1999Q4	98.68	122.58	60.05							
2000Q1	97.90	121.27	53.24							
2000Q2	98.09	121.61	63.49							
2000Q3	96.36	120.42	69.34							
2000Q4	98.83	112.97	75.17							
2001Q1	100.41	115.49	76.99							
2001Q2	103.02	121.03	82.50							
2001Q3	105.33	125.70	92.25							
2001Q4	110.73	120.29	95.87							
2002Q1	110.90	127.20	98.12							
2002Q2	110.32	130.63	107.00							
2002Q3	110.34	140.57	105.26							
2002Q4	113.19	137.73	115.38							
2003Q1	114.00	148.60	111.78							
2003Q2	115.47	150.64	124.47							
2003Q3	114.21	151.75	124.08							
2003Q4	115.56	153.51	147.87							

Source: Our calculations based on data obtained from OECD, International Labor Organization and IMF. Last 7 countries are merged under EMU from 1999Q1 onwards in Table A-4. See Table A-6 for 16 country-specific data sources.

Table A-3 continued
Country-Specific ULC^s Indices for Sweden, Switzerland, Japan,
Romania and Ukraine (1995 Average = 100)

	Sweden	Switzerland	Japan	Romania	Ukraine
1994Q1	92.05	81.27	66.60	107.34	1018.95
1994Q2	96.60	80.85	93.48	90.85	898.17
1994Q3	96.87	89.93	93.77	93.51	558.30
1994Q4	95.61	82.20	114.80	96.34	140.32
1995Q1	92.51	95.81	73.38	104.13	118.54
1995Q2	97.38	101.44	111.47	96.99	111.04
1995Q3	102.48	101.50	102.07	100.62	95.99
1995Q4	107.63	101.25	113.08	98.26	74.43
1996Q1	108.48	104.86	67.05	83.64	81.22
1996Q2	112.15	104.15	88.72	92.41	83.72
1996Q3	113.48	108.21	89.66	100.73	91.74
1996Q4	108.84	92.31	100.64	98.64	80.39
1997Q1	96.10	92.83	59.37	62.45	80.05
1997Q2	96.21	87.27	78.76	84.05	84.51
1997Q3	92.43	86.98	82.40	95.18	88.84
1997Q4	91.16	81.74	93.32	107.42	80.22
1998Q1	88.37	87.25	58.50	116.96	76.05
1998Q2	94.69	86.20	74.84	141.04	77.00
1998Q3	91.38	88.56	73.16	145.72	68.85
1998Q4	90.90	89.91	101.04	136.53	44.90
1999Q1	90.67	92.49	65.77	121.29	43.24
1999Q2	89.55	84.53	82.06	119.40	41.07
1999Q3	89.65	83.32	86.31	125.32	36.56
1999Q4	86.94	74.93	109.41	122.00	32.53
2000Q1	83.93	76.68	68.44	119.11	21.92
2000Q2	81.13	73.19	89.08	119.92	30.41
2000Q3	79.02	72.61	87.59	111.84	31.34
2000Q4	71.44	65.44	101.43	116.40	30.37
2001Q1	73.85	73.51	63.20	104.49	35.35
2001Q2	73.99	69.98	82.15	112.19	37.55
2001Q3	73.41	74.66	85.45	97.70	35.66
2001Q4	72.08	76.98	100.04	95.98	36.52
2002Q1	71.87	84.29	60.69	95.12	36.47
2002Q2	78.85	84.60	79.44	94.70	37.55
2002Q3	82.88	94.34	80.83	97.76	38.97
2002Q4	83.66	90.80	93.82	98.75	27.62
2003Q1	87.55	104.00	64.69	101.88	39.30
2003Q2	95.10	105.71	85.59	104.66	39.53
2003Q3	92.78	104.53	83.03	105.62	40.14
2003Q4	99.04	111.94	104.23	107.12	40.56

Source: Our calculations are based on data obtained from OECD, International Labor Organization and IMF. See Table A-6 for 16 country-specific data sources.

Table A-4
Data used in the Calculation of the ULC^{\$} for EMU Countries
(1995 Average = 100)

	Emp. (mfg)	Produc- tion (mfg)	Pro- duc- tivity	Nom. Wage	ULC (€)	ER (€/€)	ULC (\$)	Nom. Wage (\$)
1999Q1	98.94	110.00	111.17	109.70	98.67	89.09	110.75	123.13
1999Q2	101.11	111.80	110.57	110.50	99.94	94.63	105.60	116.77
1999Q3	103.73	104.60	100.84	111.40	110.48	95.40	115.81	116.78
1999Q4	101.39	117.50	115.89	112.30	96.90	96.33	100.60	116.58
2000Q1	100.01	115.40	115.39	113.10	98.02	101.36	96.70	111.59
2000Q2	102.19	118.30	115.76	114.30	98.74	107.13	92.16	106.69
2000Q3	104.36	111.10	106.46	115.20	108.21	110.58	97.86	104.17
2000Q4	101.98	124.40	121.98	115.80	94.93	115.09	82.49	100.62
2001Q1	100.72	120.10	119.25	116.60	97.78	108.37	90.23	107.60
2001Q2	102.70	120.30	117.14	117.60	100.40	114.59	87.61	102.62
2001Q3	104.87	110.40	105.28	118.40	112.46	112.36	100.09	105.38
2001Q4	102.14	118.10	115.62	118.60	102.58	111.69	91.84	106.19
2002Q1	100.76	115.90	115.02	119.40	103.81	114.12	90.96	104.63
2002Q2	102.84	117.70	114.44	120.50	105.29	108.89	96.70	110.67
2002Q3	105.10	109.80	104.47	121.50	116.30	101.68	114.38	119.50
2002Q4	102.63	119.60	116.53	122.20	104.86	100.34	104.51	121.79
2003Q1	101.78	116.80	114.75	123.00	107.19	93.18	115.03	132.00
2003Q2	103.91	116.80	112.41	123.90	110.22	88.14	125.06	140.58
2003Q3	106.09	109.70	103.40	125.00	120.88	88.97	135.88	140.50
2003Q4	103.42	121.60	117.58	125.60	106.82	84.13	126.98	149.30

Source: Our calculations based on data obtained from OECD, International Labor Organization and IMF.

Table A-5
Unit Labor Cost Based Competitiveness Index (ULCBCI) and
the Real Effective Exchange Rate (REER) (1995 Average = 100)

	ULCBCI	CPI Based REER	WPI Based REER
1995Q1	106.61	93.90	99.20
1995Q2	98.92	99.50	101.50
1995Q3	98.57	107.30	103.70
1995Q4	95.90	103.10	97.00
1996Q1	106.48	102.80	101.40
1996Q2	107.52	101.80	102.10
1996Q3	101.07	102.40	101.10
1996Q4	91.43	101.70	100.10
1997Q1	98.81	107.10	107.00
1997Q2	97.69	106.10	106.10
1997Q3	96.45	111.30	108.40
1997Q4	95.39	115.90	110.70
1998Q1	99.57	116.20	111.00
1998Q2	90.08	115.50	108.90
1998Q3	88.12	121.10	110.90
1998Q4	78.69	120.90	107.90
1999Q1	82.94	121.80	108.00
1999Q2	92.17	121.50	106.80
1999Q3	93.64	124.10	107.40
1999Q4	91.24	127.30	108.80
2000Q1	89.20	132.40	114.30
2000Q2	93.02	132.30	112.50
2000Q3	95.48	139.00	114.10
2000Q4	80.85	147.60	118.30
2001Q1	94.83	113.50	95.40
2001Q2	129.54	111.80	99.00
2001Q3	158.37	98.50	88.50
2001Q4	147.35	116.30	107.30
2002Q1	130.36	138.40	128.50
2002Q2	135.08	118.90	110.80
2002Q3	161.66	115.20	107.90
2002Q4	145.37	125.40	117.10
2003Q1	155.83	123.50	118.50
2003Q2	144.47	140.60	130.40
2003Q3	138.87	151.50	137.50
2003Q4	138.59	140.60	126.20

Source: Central Bank of Republic of Turkey and our calculations based on data obtained from State Planning Organization of Turkey, OECD, International Labor Organization and the IMF.

Table A-6
Data Sources for the Country-Specific Variables

COUNTRIES	VARIABLES			
	Employment	Production (mfg)	Nominal Wage	Nominal Exchange Rate
USA	OECD Database	OECD Database	OECD Database	IMF-IFS
Germany	OECD Database	OECD Database	OECD Database	IMF-IFS
Austria	OECD Database	OECD Database	OECD Database	IMF-IFS
Belgium	OECD Database	OECD Database	OECD Database	IMF-IFS
France	OECD Database	OECD Database	OECD Database	IMF-IFS
Netherlands	OECD Database	OECD Database	OECD Database	IMF-IFS
UK	OECD Database	OECD Database	OECD Database	IMF-IFS
Spain	OECD Database	OECD Database	OECD Database	IMF-IFS
Sweden	OECD Database	OECD Database	OECD Database	IMF-IFS
Switzerland	OECD Database	OECD Database	OECD Database	IMF-IFS
Italy	OECD Database	OECD Database	OECD Database	IMF-IFS
Japan	OECD Database	OECD Database	OECD Database	IMF-IFS
Romania	ILO-Statistics	OECD Database	OECD Database	IMF-IFS
Russia	ILO-Statistics	OECD Database	IMF-IFS	IMF-IFS
Ukraine	OECD Database	OECD Database	IMF-IFS	IMF-IFS
EMU	ILO-Statistics	OECD Database	IMF-IFS	IMF-IFS
TURKEY	SPO-Turkey	SPO-Turkey	SPO-Turkey	SPO-Turkey

Özet

Uluslararası Rekabet ve Birim Ücret Maliyetine Dayalı Rekabet Endeksi

Çalışmanın amacı, Türkiye için ülkelerarası nisbi birim maliyetlere dayalı bir rekabet gücü endeksi oluşturmaktır. Uluslararası rekabet gücünün ölçümünde reel kur ile birlikte nisbi maliyetlere dayalı bir rekabet gücü endeksinin kullanılmasının yararı ortaya konulduktan sonra, analiz bölümünde adı geçen endeksin formülasyonu verilmiştir. 1999-2003 aralığında TL'nin yabancı para karşısında değerlenmesine karşın ihracatta görülen yüksek ivme, Türkiye'de nisbi produktivite artışı ve dolar bazında ücretlerin görece olarak düşük kalması nedeniyle birim ücret maliyetlerinin ticaret ortaklarınınkinin çok altında kalması ile izah edilmiştir.