



PRODUCTIVITY ANALYSIS

ECONOMICS RESEARCH CENTRE

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PRODUCTIVITY DEVELOPMENTS PRIOR TO THE ECONOMIC CRISIS

SUMMARY

The current economic crisis in Cyprus has highlighted the importance of productivity growth and competitiveness. In this bulletin we analyse productivity changes in the period prior to the economic crisis, stressing the key role played by the labour cost over this period. Furthermore, we look at differences in productivity growth between Cyprus and the Eurozone average to assess changes in the competitiveness of Cyprus vis-à-vis its European partners. The investigation is carried out at the level of the economy as a whole, and at the level of individual sectors.

In Cyprus labour productivity growth during the period 1996–2011 was, on average, 1.7%. It was 2.1% in the sub-period 1996–2001, but then dropped to 1.7% in the sub-period 2002–2007, and 0.9% the sub-period 2008–2011. The labour inflow, mostly from Eastern Europe, following the country's accession to the EU in May 2004 increased labour supply and exerted downward pressure on wages. Labour productivity also increased. In spite of these positive developments, however, the (real) unit labour cost continued to be high up to and including 2007. Furthermore, during the same period the increase of the unit labour cost in Cyprus was significantly above the Eurozone average resulting in substantial loss of competitiveness.

As regards sectoral developments the best productivity performers vis-à-vis the corresponding sectors in Eurozone during the period under investigation were 'Construction', 'Transport & Storage', 'Finance & Insurance' and 'Health'; while 'Manufacturing', 'Accommodation & Food', 'Electricity, Gas & Water' and 'Education' were the sectors underperforming compared to their Eurozone counterparts. These findings highlight the fact that sectors controlled by trade unions (especially those with a large public sector component) are more prone to loss of competitiveness than other sectors of the economy. Nevertheless, in interpreting the results reported in this bulletin one has to be cautious because of measurement errors associated with output, particularly in service industries such as banking. In other words, the high performance of the 'Financial & Insurance' sector during the period prior to its collapse, may be an artefact of its impressive but, as subsequently proved, unsustainable expansion.

Although the importance of improvements in productivity and competitiveness for lifting the economy out of the current economic crisis is often stressed in public debate in Cyprus, few appear to fully understand the meaning of these concepts; and even fewer understand what needs to be done in order to achieve such improvements. This is demonstrated by the emphasis placed on the level of pay without connecting this to the value added generated by this pay. For instance, the discussion often focuses on a small number of high-paid employees (mainly in the public sector), ignoring the fact that middle- and low-paid employees are remunerated more than the value added of their work. As these workers represent the bulk of employment in the economy, the improvement in overall productivity and competitiveness cannot be achieved without addressing the waste from paying people for output with value well below their remuneration, even when this remuneration is considered low in absolute terms.

In conclusion, for many years employees in the public and some parts of the private sector have been paid more than their value added. This has been the result of employment and pay decisions strongly influenced by labour unions and other lobby groups driven by political and ethical rather than economic considerations. These labour market distortions are largely responsible for the loss of competitiveness of the Cyprus economy and – without overlooking the difficulties in the measurement of output mentioned above – taking urgent steps to re-align pay to productivity at all salary and wage levels is a pre-requisite for economic recovery.



1. Introduction

The current economic crisis in Cyprus has highlighted the importance of productivity and competitiveness for sustained economic growth. In this bulletin we analyse productivity changes over the period prior to the economic crisis, highlighting the key role played by wages and, in particular, the unit labour cost (ulc), i.e. the cost of labour required to produce one unit of output.

In general, productivity shows how efficiently inputs are converted into output. At the individual company level, increase in productivity translates to higher profits and/or wages. At the country level, productivity is a key (and in the long-run, probably, the only) determinant of per capita income and, therefore, standards of living. A country can gain competitiveness when its productivity increases at a rate faster than that of its trading partners.

The two most widely used measures of productivity are labour productivity and total factor productivity (tfp).

- *Labour productivity* is the ratio of the output of goods and services to the labour hours devoted to the production of that output. Labour productivity growth and the (hourly) wage rate determine the ulc.
- *Total-factor productivity* measures how efficiently inputs are used to generate output, as it captures the part of output growth not explained by the contributions of inputs (labour and capital). It reflects advances in knowledge, improvements in organisation/management, reallocation of resources to more productive uses etc.

In this bulletin we focus on labour productivity. Moreover we compare the rate of productivity growth in Cyprus with the Eurozone average to assess changes in the competitiveness of Cyprus vis-à-vis its European partners. Our investigation is carried out at the level of the economy as a whole and at the level of individual sectors.

2. Labour Productivity and Wages

2.1 Labour productivity in Cyprus

In Cyprus, labour productivity growth during the period 1996–2011 was on average 1.7%. It was 2.1% in the sub-period 1996–2001, but then dropped to 1.7% in the sub-period 2002–2007, and to 0.9% in the sub-period 2008–2011.

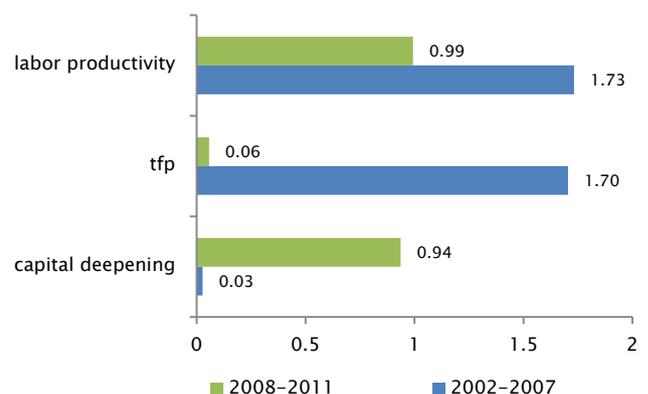
- The reduction in the rate of labour productivity growth during 1996–2001 is mainly caused by a large decrease

that took place in 2003. Notably, in this year there was a slowdown of economic activity caused by a large fall in tourism arrivals and revenues, reduction of economic activity in Manufacturing, Electricity, Gas & Water; and, to a smaller extent, reduction of economic activity in the Construction sector. These negative developments, combined with increase in real earnings, are probably the factors behind the negative labour productivity change observed in 2003.

- The further decrease in the growth rate of labour productivity during 2008–2011 can be attributed to the fact that after 2008 both labour and output growth decelerated. Major sectors of the economy (including Wholesale & Retail Trade, Hotels & Restaurants and Transport, Storage & Communications) contracted during 2009; while employment (and the share of labour in output) decreased. The rate of unemployment increased from 3.8% in 2008 to 7.9% in 2011.

Figure 1, helps to better understand the developments in labour productivity in Cyprus during the years prior to the economic crisis by showing its main components: total factor productivity plus capital deepening, the latter being the increase in capital services per hour worked.¹ As seen from this figure during 2002–2007 capital deepening is small, indicating that investments were low and/or directed into unproductive activities. Thus, labour productivity growth during this period is due to increase in the total factor productivity which, as said earlier, is output increase not explained by increase in inputs and can be attributed to technical/management improvements (perhaps, associated with Cyprus accession to the European Union).

Figure 1: Labour productivity, total factor productivity and capital deepening in Cyprus (2002–2011)



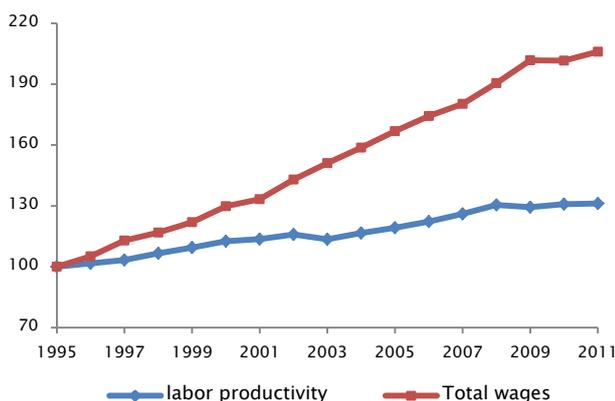
¹ Capital deepening is an increase in capital intensity in production, i.e. more capital – relative to labour – services are used.

During 2008–2011 both labour productivity and total factor productivity drop, with the latter getting close to 0%. Capital deepening, however, increased and contributed to labour productivity growth being higher than total factor productivity. These figures suggest that during this period there was substitution of labour for capital, with capital growth appearing to accelerate, probably, due to increased investment in productive projects.

As noted earlier, the ulc measures the cost of labour per unit of output; whereas labour productivity measures the quantity of labour (hours worked) per unit of output. Thus, the difference between the two measures highlights the importance played by wages in productivity and this is illustrated in the figures which follow.

In Figure 2, we observe a gap between the indices of labour productivity and wages (wage bill), with the wage index being above the labour productivity one throughout the period 1995–2011; and with the divergence between the two indices constantly increasing. This suggests that the real ulc was increasing throughout the period, indicating a loss in competitiveness of the Cyprus economy. The gap between the two indices appears to be larger during 2009–2011, when wages increased by 4.4% annually, while labour productivity increased by only 1.6%.

Figure 2: Labour productivity and wage indices in Cyprus (1995–2011)

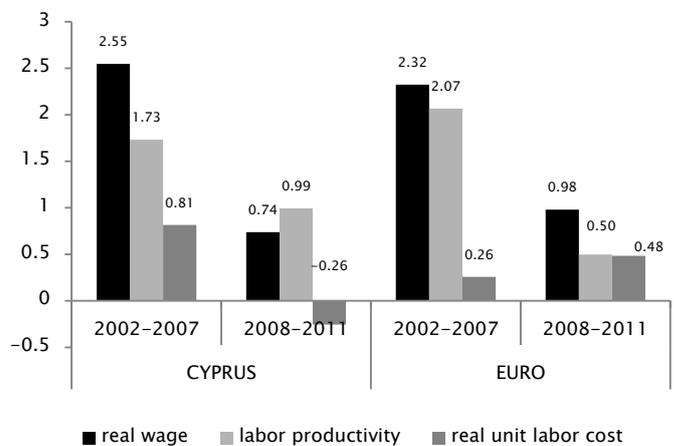


2.2 Comparisons with Eurozone

The unit labour cost used in production can have a substantial impact on competitiveness. A country with lower unit labour cost gains an advantage relative to its trade partners. Thus, by comparing the growth rate of unit labour cost in different countries one can draw conclusions about changes in their competitiveness.

Figure 3 shows the difference between labour productivity and real wages in Cyprus and Eurozone. The growth of real wages is above the growth of labour productivity during 2002 and 2007 in both Cyprus and Eurozone. Thus, the growth rate of the real ulc is positive. There is also a noticeable reduction in the growth rates of all indices between the periods 2002–2007 and 2008–2011 for both Cyprus and Eurozone.

Figure 3: The growth rate of labour productivity, real ulc & real wages



However,

- in the period 2002–2007 the growth rate of real ulc in Cyprus was higher compared to the Eurozone average, indicating loss of competitiveness for Cyprus; whereas,
- in the period, 2008–2011 the growth rate of real ulc is negative in Cyprus and positive in Eurozone, implying a gain in competitiveness for Cyprus.

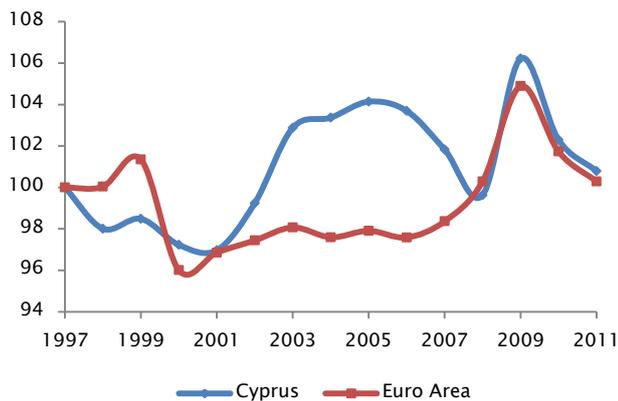
Figure 4 provides an illustration of how the competitiveness of the Cyprus economy evolved during 1997 and 2011, vis-à-vis its Eurozone partners. The diagram in this figure shows the real ulc in Cyprus and Eurozone, indexed to 1997=100.² The gap between the two indices reflects changes in competitiveness.

The graph in Figure 4 shows that real ulc in Cyprus was substantially higher than that in Eurozone between 2002 and 2007. After 2008 the two indices move together, although the Cyprus index continued to be slightly above

² The ulc has been converted to real using the consumer price index, in order to conduct meaningful comparisons, over time and across countries, in the sense that changes in ulc do not reflect changes in inflation.

the Eurozone average. Notably, in both Cyprus and Eurozone the real ulc reached a peak in 2009 and then started falling. This was probably due to recession, with wage increases being curtailed by rising unemployment, while output was decreasing.

Figure 4: Real unit labour cost in Cyprus and Eurozone (1997=100)



Based on the results reported in Figure 4, one may conclude that during the period 2001–2007 the Cyprus economy has sustained a large loss of competitiveness vis-à-vis its Eurozone partners; while during 2008–2011, the period closer to the onset of economic crisis in Cyprus, no perceptible changes in competitiveness are observed.

3. Sectoral Analysis³

In the previous section we examine the evolution of the real ulc at the level of the economy as a whole. In this section we focus on how the real ulc evolved over the period prior to economic crisis in various sectors of the economy.

Again, we examine changes in competitiveness over time by comparing the real ulc growth of sectors in Cyprus with the (average of) real ulc growth of corresponding sectors in the Euro Area. Furthermore, labour productivity and real wages are added to the analysis. This addition helps towards better understanding changes in competitiveness, as the growth rates of the three measures add up: the growth rate of the real ulc is the difference between the growth rate of real wages and labour productivity. Furthermore, each of these measures has policy interest of its own.

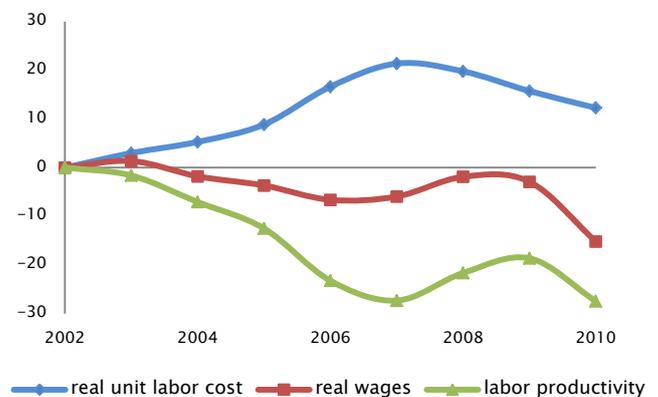
In the figures below, we report the difference between the three measures (real ulc, wages and labour productivity) in Cyprus and Eurozone. To ease this comparison these measures are first indexed to 2002=100; thus a positive (negative) value means that the measure compared increases (decreases) faster in Cyprus than in Eurozone.

As said earlier an increase of real ulc in Cyprus relative to the Eurozone average indicates an improvement of the country's competitiveness. Thus, a negative real ulc in the graphs shows improvement in the competitiveness of Cyprus vis-à-vis its Eurozone partners. The real ulc is reduced when real wages fall and/or labour productivity increases.

3.1 Manufacturing

The real ulc in Manufacturing was increasing in Cyprus until 2009; and, as shown in Figure 5, this sector was a consistent underperformer relative to Eurozone throughout the 2002–2011 period.

Figure 5: Differences in real ulc, real wages and productivity between Cyprus and Eurozone: Manufacturing



The loss of competitiveness of the Manufacturing sector in Cyprus over the period under investigation is attributed to increasing real wages and falling labour productivity. Labour productivity declined mainly due to declining output during the period 2004–2006. It is worth pointing out here that Manufacturing is among the sectors in Cyprus where the participation of employees in labour unions is high. This could be a potential explanation why, during the period under examination, real wages were kept high even though labour productivity was decreasing.

³ For brevity we name some composite sectors using only the first sector.

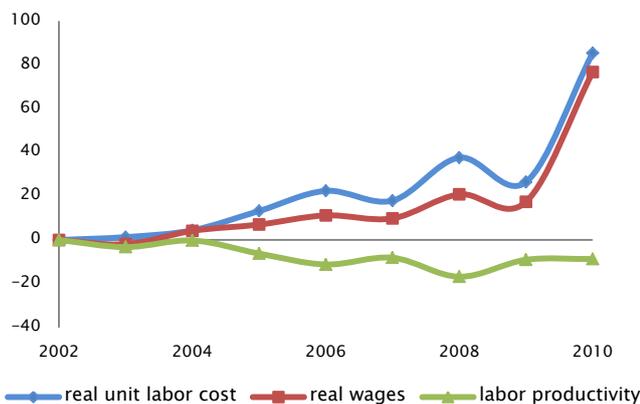
3.2 Electricity, Gas & Water

The composite sector of Electricity, Gas & Water, which is mainly state controlled, is shown in Figure 6 to be also underperforming in terms of real ulc.

The increase in real ulc relative to Eurozone in this sector is, indeed, striking; especially in 2009 and 2010. Overall, this sector sustained the largest loss in competitiveness (more than 75%) during the period 2002–2010. Labour productivity, relative to Eurozone, was rather stable, largely salvaged by large additions of new capital. Yet the competitiveness of the sector was substantially eroded by the huge increase of real wages, almost 70% above the increase in Eurozone, in 2009 and 2010.

- In 2009 gross wage and salaries increased from €27.8 to €49 million in the Water sub-sector and from €42 to €74 million in the Electricity & Gas sub-sector.
- In 2010 gross wage and salaries increased from €23.1 million to €38 in the Electricity & Gas sub-sector, and from €35 to €57.4 million in the water sub-sector.

Figure 6: Differences in real ulc, real wages and productivity between Cyprus and Eurozone: Electricity, Gas & Water

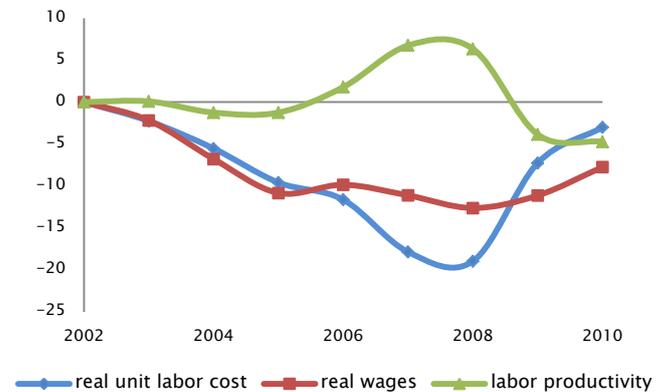


The large increase in wages and salaries in the Electricity, Gas & Water sector can be associated with the fact that labour union participation among employees in this sector is among the highest in the country.

3.3 Construction

The competitiveness of the Construction sector in Cyprus was increasing between 2002 and 2008, when it reached its peak. Labour productivity was increasing and real wages were decreasing vis-à-vis those in Eurozone over the period 2002–2008; afterwards this trend was reversed.

Figure 7: Differences in real ulc, real wages and productivity between Cyprus and Eurozone: Construction



The decrease of real wages during 2002–2008 can be attributed to the large inflow of foreign workers. This raised competition in the labour market and suppressed wages. After 2008, recession in the housing market led to a small outflow of foreign workers and a slight increase in real wages. In the last three years of the period under investigation, output in the sector declined faster than labour, resulting in a decline of labour productivity relative to Eurozone by over 22%.

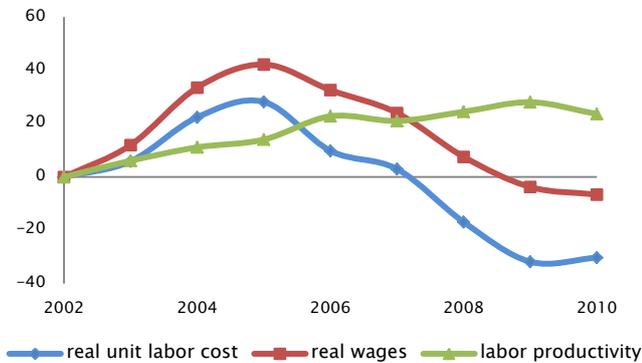
It should be noted here that the upward trend of labour productivity of the Construction sector in Cyprus before 2008 was mainly due to increased investments and capital deepening (substitution of capital for labour). New productive investment during this period increased the growth rate of capital stock of the sector between 2006 and 2008 by 10%, but this rate dropped to almost zero in 2009.

3.4 Transportation & Storage

The Transportation & Storage sector realised a substantial improvement in competitiveness after 2005, by achieving higher real ulc performance than that achieved, on average, by the corresponding sectors in Eurozone.

The share of air-transportation related services is around 64% of the total sectoral output. Therefore, the real ulc performance of the Transportation & Storage sector in Cyprus relative to Eurozone seen after 2005 and up until 2009 can be largely due to the privatization of the national airports in 2006. After 2009 the sectoral output declined faster than labour, resulting in a downward trend in labour productivity. Furthermore, between 2008 and 2009 the growth of real wages was lower in Cyprus than in Eurozone.

Figure 8: Differences in real ulc, real wages and productivity between Cyprus and Eurozone: Transportation & Storage

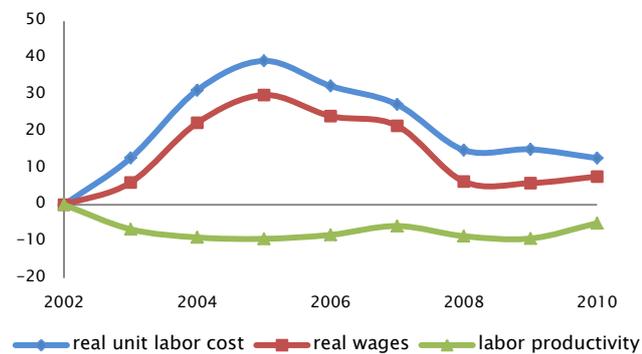


The slight (relative to the Eurozone area) drop of labour productivity after 2009 was largely due to the reduction in the growth rate of capital stock, which became zero in 2010 (and negative in 2011).

3.5 Accommodation & Food

The Accommodation & Food sector includes mostly tourism related activities. The sector was experiencing huge increases in real wages before 2005. Figure 9 shows that since then, on average, real wages have been decreasing by over 3% annually. Most likely this is the result of the inflow of workers from Eastern European countries after Cyprus accession to the EU in May 2004.

Figure 9: Differences in real ulc, real wages and productivity between Cyprus and Eurozone: Accommodation & Food



Given that labour productivity remained relatively constant, especially after 2005, the contraction of real wages pushed real ulc down, closing the gap that existed between Cyprus and the Euro area average. The capital intensity of the sector is close to zero, suggesting that new investments were mostly for capital maintenance.

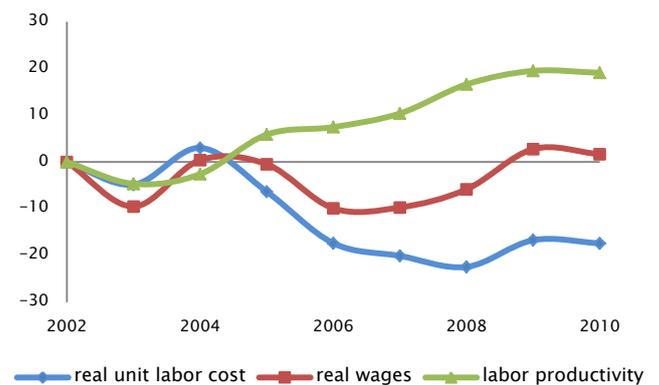
Given that Accommodation & Food is not only one of the largest sectors in Cyprus but also the most resilient to local

business cycles (because it depends mostly on foreign demand) emphasis should be given to improving its competitiveness. This can be done, among other, by reducing the rate of growth of real ulc (reduce real wages and/or increase output per hour worked) which, as seen in Figure 9, has been above the Eurozone average since 2002.

3.6 Finance & Insurance

Figure 10 shows that the Financial and Insurance sector in Cyprus has been gaining in competitiveness in Eurozone since 2005. Real ulc in Cyprus has been rising at a rate lower (even though real wages have been growing slightly faster) than the Eurozone average. Thus, the improvement in competitiveness is attributed to the labour productivity of the sector growing faster in Cyprus than in Eurozone.

Figure 10: Differences in real ulc, real wages and productivity between Cyprus and Eurozone: Finance & Insurance



As the contribution of investment (and capital deepening) to improvements in competitiveness is almost zero, one can argue that the increase in productivity of labour was mainly coming from 'technological' improvements (advances in knowledge, organisation, management etc). Nevertheless, it is crucial to point out that due to the nature of the Financial and Insurance sector, output measurement issues can lead to substantial bias in the estimation of productivity. Therefore, the high performance of the Financial and Insurance sector during the period prior to its collapse, can be an artefact of its impressive but, as subsequently proved, unsustainable expansion.

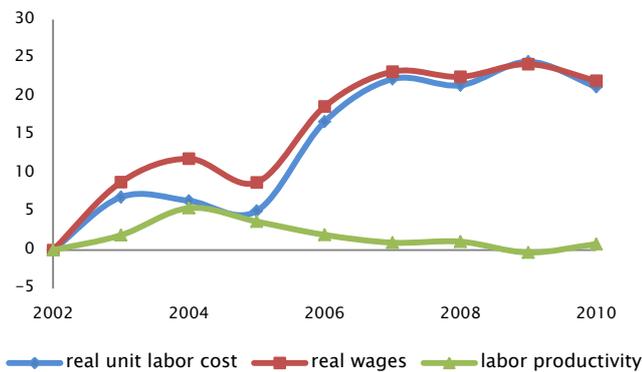
3.7 Education

The Education sector in Cyprus has been losing in competitiveness between 2005 and 2010, with the real ulc increasing sharply relative to the Eurozone average. The

labour productivity of the sector in Cyprus was more or less the same as in Eurozone during 2002 and 2010.

It is clear from the diagram of Figure 11 that the increase in wages is almost fully responsible for the loss of competitiveness of the education sector in Cyprus vis-à-vis the corresponding sectors in Eurozone. However, it is important to point out here that, as with most sectors of the economy, Education consists of sub-sectors with different characteristics and size, e.g. 90% of total expenditure in Cyprus is allocated to the primary and secondary and only 10% to higher education. Therefore, analysis applied to each sub-sector separately is required in order to extract robust conclusions about the reasons why Education in Cyprus appears to be underperforming in terms of real ulc vis-à-vis other countries in Eurozone.

Figure 11: Differences in real ulc, real wages and productivity between Cyprus and Eurozone: Education

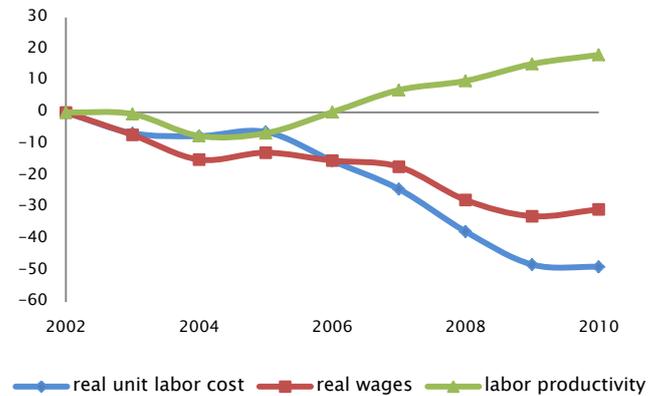


3.8 Health

Competitiveness in the health sector of Cyprus is improving impressively over the period investigated in this bulletin. This is indicated in Figure 12 by the sharp decline of real ulc relative to Eurozone. The growth of real wages in the Health sector was also lower in Cyprus than in Eurozone as a whole.

Between 2005 and 2010 labour productivity in the Health sector of Cyprus was increasing faster than the Eurozone average. This appears to be due to the increasing output; but, also, due to the negative growth rate of labour. Capital stock was also growing; and there was an increase in output that can be attributed to increasing total factor productivity.

Figure 12: Differences in real ulc, real wages and productivity between Cyprus and Eurozone: Health



In conclusion, the increase in labour productivity of the Health sector in Cyprus can be the combined outcome of low real wage rises, technological improvements and high investment. The curtailing of the rate of growth of real wages in the sector after 2005 can be due to the inflow of health personnel, mainly from Eastern European countries.

4. Conclusion

In May 2004 Cyprus became a full member of the European Union. The labour inflow, mostly from Eastern Europe, following the country's accession to the EU in May 2004 increased labour supply and exerted downward pressure on wages. Labour productivity also increased. In spite of these positive developments, however, the (real) unit labour cost continued to be high up to and including 2007. Furthermore, during the same period the increase of the unit labour cost in Cyprus was substantially above the Eurozone average resulting in substantial loss of competitiveness.

As regards sectoral developments the best productivity performers vis-à-vis the corresponding sectors in Eurozone during the period under investigation were 'Construction', 'Transport & Storage', 'Finance & Insurance' and 'Health'; while 'Manufacturing', 'Accommodation & Food', 'Electricity, Gas & Water' and 'Education' were the sectors underperforming compared to their Eurozone counterparts. These findings highlight the fact that sectors controlled by trade unions (especially those with a large public sector component) are more prone to loss of competitiveness than other sectors of the economy.



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