PRODUCTIVITY ANALYSIS

ECONOMICS RESEARCH CENTRE

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MULTILATERAL COMPARISONS OF PRODUCTIVITY AMONG EUROPEAN COUNTRIES AND CYPRUS

UNIVERSITY OF CYPRUS

SUMMARY AND POLICY CONCLUSIONS

This bulletin reports results obtained from using *multilateral comparisons** to analyze differences between levels of total factor productivity among European countries for the period 2000-2012. Our results indicate that countries in West and Central Europe are doing better with respect to the level of productivity, when compared to other Mediterranean and East European countries. Furthermore, we observe that most of the countries experienced increases in their productivity throughout the years. The productivity increases in the West and Central European countries are mainly due to increases in output, while the increases in the Mediterranean and East European countries are mainly due to more efficient use of their inputs. It is important to note that our results suggest that the less productive countries are those with the higher productivity growth. That is, Mediterranean and East European countries show a faster productivity growth compared to the West -Central European ones.

In the context of the above cross country analysis of productivity, it appears that Cyprus is located in the group of countries with the lowest productivity level, although it occupies the best position (with the highest productivity) after 2005. This is because this high productivity growth rate was not enough to improve the relative position of Cyprus when compared with the advanced European countries. It only managed to obtain a better position in the low productivity group. In order to catch-up with the other groups and especially the first one, Cyprus needs to find ways to increase its productivity even more.

Boosting productivity is critical to each country's future economic welfare (well-being). Raising productivity growth rates is crucial for European countries, especially Mediterranean and East-European countries if they are going to catch-up with the Western and Central European ones. For these countries, including Cyprus, placing productivity growth at the centre of their economic policy is crucial, in the sense that without raising their productivity growth substantially above that of Western and Central European, they will never be able to become competitive and have gains from being a member of the EU.

For Cyprus, finding its own path towards higher productivity growth is of utmost importance. Recent policies aiming at privatization of state owned companies, removing barriers and introducing greater flexibility in the labour market, reforming the public sector to minimize wasteful bureaucracy and increase efficiency are, among others, measures in the right direction in order to increase productivity and, as a result, economic growth.

* The 'multilateral productivity comparisons' are based on the output difference minus the cost shares weighted input differences of a country with a hypothetical country that is used as a point of reference. The reference country is the geometric mean over the total number of countries. Therefore, a country is more productive compared to other countries if the productivity difference with the reference country is higher than the others. Using this analysis one can obtain a ranking of the countries based on their productivity level.

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1. Productivity ranking of EU countries

Productivity is considered a key source of economic growth and competitiveness in an economy and, consequently, of the well-being of its people. An economy is considered competitive, relative to other countries, if it can produce output of the same quality as other countries but with lower cost (or better quality output with the same cost).

The economic theory of index numbers provides tools that can be used in making multilateral (and bilateral) productivity comparisons.[1] The productivity comparisons in this bulletin are based on the period 2000-2012 and on the following countries: Belgium, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Netherlands, Austria, Portugal, Slovenia, Slovakia and Finland.

The data are from several publications of Eurostat and the European Commission. In order to be able to compare countries, we require comparable measures of factor inputs and output. To achieve comparability in measuring output and factor inputs one needs to employ purchasing power parities (PPP) of output, capital and labor for all the countries under consideration. Therefore, all price and quantity data used in the analysis are expressed in constant 2000 Euros and are PPP adjusted.

Table 1, presents the ranking of countries, with respect to productivity for the years 2000-2012, relative to a (hypothetical) 'reference country' which has been normalized to have productivity equal to 1. Reading this table vertically shows the productivity level of each country at the specific year; while reading this table horizontally shows the productivity change of a country over time.

Table 1 shows that that there are some variations with regard to the productivity ranking of the countries. However, four countries, Belgium, France, Netherlands and Germany are always at the top of the rank. The last five countries in the ranking are always also the same: Portugal, Cyprus, Greece, Estonia and Slovakia. Specifically, Cyprus ranked fifth from the end, followed by Slovakia, Greece, Portugal and Estonia throughout all the years under investigation.

[1] The multilateral productivity comparisons are based on the productivity difference of each country from a (hypothetical) country, which is used as a point of reference. The reference country is the geometric mean over the total number of countries. Therefore, a country is more productive compared to other countries if its productivity difference with the reference country is higher than the others.

Table 1: Rankings with respect to productivity

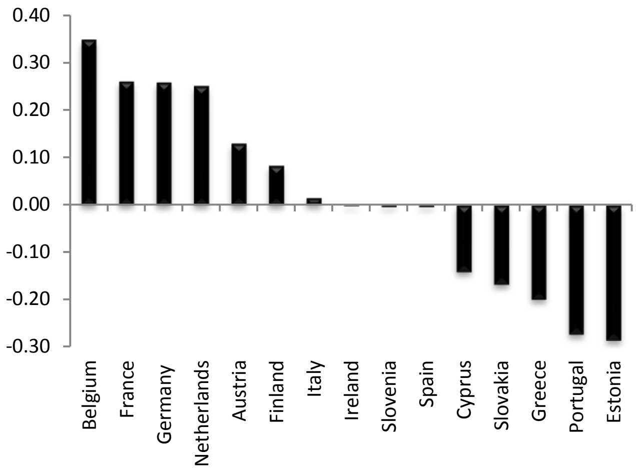
	2000	2001	2002	2003	2004	2005	2006
Belgium	1.214	1.169	1.200	1.189	1.208	1.184	1.196
France	1.195	1.214	1.268	1.248	1.219	1.232	1.261
Germany	1.032	1.040	1.041	1.059	1.073	1.086	1.117
Netherlands	1.096	1.100	1.128	1.118	1.164	1.173	1.192
Austria	0.902	0.886	0.900	0.913	0.933	0.942	0.990
Finland	0.902	0.912	0.921	0.922	0.984	0.996	1.031
Italy	0.800	0.818	0.783	0.776	0.776	0.790	0.799
Ireland	0.737	0.760	0.789	0.829	0.878	0.892	0.892
Slovenia	0.675	0.675	0.666	0.679	0.711	0.766	0.829
Spain	0.855	0.862	0.881	0.882	0.883	0.886	0.896
Cyprus	**0.579**	**0.577**	**0.597**	**0.612**	**0.643**	**0.669**	**0.693**
Slovakia	0.410	0.435	0.476	0.499	0.499	0.530	0.581
Greece	0.523	0.555	0.601	0.630	0.663	0.644	0.666
Portugal	0.585	0.588	0.586	0.589	0.596	0.632	0.644
Estonia	0.510	0.526	0.559	0.593	0.620	0.657	0.683

	2007	2008	2009	2010	2011	2012
Belgium	1.214	1.196	1.158	1.175	1.350	1.348
France	1.261	1.230	1.227	1.254	1.251	1.261
Germany	1.142	1.141	1.095	1.145	1.248	1.258
Netherlands	1.226	1.234	1.197	1.184	1.275	1.251
Austria	1.011	1.021	0.999	1.029	1.124	1.130
Finland	1.108	1.104	0.999	1.034	1.099	1.083
Italy	0.814	0.823	0.786	0.834	1.037	1.015
Ireland	0.901	0.876	0.916	0.933	0.986	0.998
Slovenia	0.881	0.871	0.766	0.793	1.009	0.996
Spain	0.910	0.924	0.928	0.923	0.981	0.996
Cyprus	**0.719**	**0.770**	**0.766**	**0.754**	**0.867**	**0.858**
Slovakia	0.667	0.718	0.700	0.746	0.820	0.832
Greece	0.674	0.679	0.677	0.651	0.832	0.800
Portugal	0.658	0.661	0.658	0.676	0.733	0.726
Estonia	0.731	0.714	0.680	0.708	0.681	0.713

Figure 1, shows the productivity differences of countries from the reference one for 2012. In this year, the West and Central European countries have high productivity; while the productivity of Mediterranean and East European countries is comparatively low. In fact, one can consider three groups:

- At the top are the Western and Central European countries: Belgium, France, Germany, Netherlands, Austria and Finland.
- In the middle we find Italy, Ireland, Slovenia and Spain.
- At the bottom group are Cyprus, Slovakia, Greece, Portugal and Estonia.

Figure 1: Productivity differences in 2012

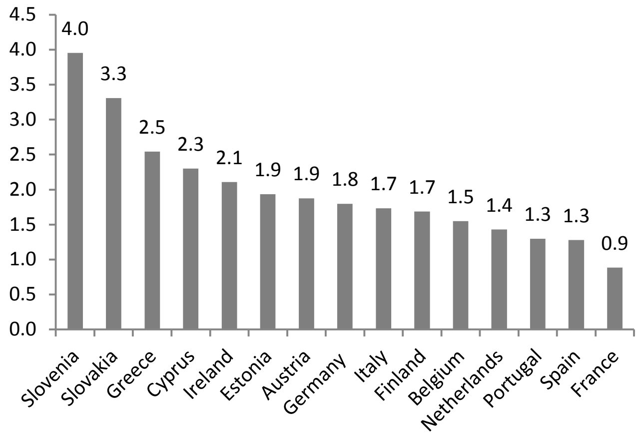


2. Productivity growth over time

The rows of Table 1 can help one see how the productivity of each country changes over time.[2] Most of the countries appear to achieve an increase in their productivity over the period 2000-2012. The productivity increases in the West and Central European countries are mainly due to increases in output, while the increases in the Mediterranean and East European countries are mainly due to more efficient use of their inputs.

It is important to note that our results suggest that less productive countries are among those with the highest productivity growth. Figure 2, reporting the average productivity growth rate for the period 2000-2012, shows that productivity growth is higher in Slovenia, followed by Slovakia, Greece, Cyprus, Ireland, and Estonia, the countries with the lowest productivity levels.

Figure 2: Average productivity growth % (2000-2012)



Boosting productivity is critical to each country's future economic welfare (well-being). High productivity growth rates is crucial for Mediterranean and East-European ones in order to catch-up with the West and Central European ones. Thus, making productivity growth the center of their economic policy is crucial for countries like Cyprus and Greece to be able to compete with the Western and Central European countries.

3. Conclusion

The cross country comparisons suggest that Cyprus is in the group of countries with the lowest productivity level. For the period 2000-2012, the rate of productivity growth of Cyprus economy is, on average, 2.3%, the third highest in the sample used in our analysis (see figure 2). However, this was not enough to improve the relative position of Cyprus when compared with the advanced European countries. It only managed to obtain a better position in the low productivity group. In order for Cyprus to catch-up with the productivity of Western and Central European countries, ways to further increase its productivity are needed.

Recent policies aiming at privatization of state owned companies, removing barriers and introducing greater flexibility in the labour market, reforming the public sector to minimize wasteful bureaucracy and increase efficiency are, among others, measures in the right direction in order to increase productivity and, as a result, economic growth.

[2] Productivity increases or decreases (changes) are basically associated with changes in output and total inputs since the total factor productivity is constructed as output growth minus a weighted average of the growth of inputs.

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