

A brief note on sector productivity in CEE countries

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Abstract:

Employing Eurostat data spanning 1995-2009 we have calculated aggregate as well as sector labor productivities for nine Central and Eastern European countries. We analyzed the calculated productivity levels and productivity growth rates during 1995-2009 time period comparing them with EU(15) averages. We found that market services and other industries report the highest productivity levels when comparison is made within the EU(9) universe. When comparing to EU(15), productivity in market and non-market services is relatively highest i.e. the productivity gaps between the East and West narrowest. Two traditional sectors - manufacturing and agriculture - have seen the highest productivity growth during the time period 1995-2009, both in CEE as a region and in essentially all individual CEE countries. However, their productivity level remains relatively low in most countries. We document on-going convergence in productivity both at the aggregate and sector level. After decomposing the productivity growth we found that re-allocation effect played a positive role in all except one CEE country (Slovakia), but was relatively small. Last, but not least, if we are to trust the data, there exists a substantial potential for productivity increase resulting from sector re-allocation of labor to EU(15) economic structure only in two countries, Romania and Poland.

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I. Introduction

Countries of Central and Eastern Europe started their transition to market economies with much lower income levels than those prevailing in the West. This was natural after decades of communism as it reflected a lower level of labor productivity, as the main factor. This was largely because the initial capital stock was of low quality or obsolete and managerial, organizational and institutional deficiencies in the early transforming economies rampant (Kornai,1992). Another reason for low productivity was prevailing sector structures in many CEE economies which - at the onset of transition - had a large share of working population allocated to relatively low value added sectors (Roland, 2000). The process of transition to a market economy - and later that of convergence to the developed West - was expected to lead to sector adjustments which would conduce to higher labor productivity.

After growing out of early transformational recessions in the early 1990's, there has been a substantial catching-up with the Western part of Europe. Countries in CEE were able to significantly raise their income levels to reduce the gap with EU(15). This was primarily due to sharp increases in labor productivity driven by additional capital investments, technological transfer, improvements in management techniques, some institutional convergence (driven in part by the EU admission process) and, not least, growing benefits of market-based economic coordination.

In this paper we look at the evolution of labor productivity in EU (9) countries documenting the on-going convergence with the developed West. Employing the Eurostat data during 1995-2009 we show which countries have reported the highest aggregate labor productivity growth up till 2009. Second, we attempt document the main contours of the sector landscape in each country highlighting the sectors most absorbing the labor and the sectors which showed the highest productivity growth. Third, we decompose the productivity growth on the country level to see the significance of productivity growth "within sectors" vs. reallocation effect. Fourth, we calculate how much more productive EU (9) would become if they adopted the average EU(15) sector structure. Finally, we draw some stylized facts from the data.

II. Used data

We have employed Eurostat database to collect time series for gross value added by NACE sectors in current and 2000 prices (local currency), number of persons employed by the sectors as well a matrix on PPP exchange rates. Our EU (9) sample includes Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia¹. Our dataset covers data from 1995 till 2009.

III. Evolution of aggregate productivity

We have compared the level of aggregate productivity in EU(9) countries in 1995 and 2009 with the average for EU (15). We used aggregate value added in current prices divided by number of persons employed and converted to PPP in to allow meaningful cross-country comparisons. The Table 1. reports the comparison of the aggregate labor productivity in 1995 in both nominal terms (ECU) and in PPP terms. The table also shows the aggregate productivity relative to EU (15) to document the gap between the transition countries and EU(15) in the mid-1990's.

Table. 1 Aggregate labor productivity in 1995

	1995		
	ths. LC	ths. ECU	EU15=100 PPP
EU15	38,9	38,9	100,0
CZ	273,1	7,9	56,6
SI	9,6	14,9	55,3
HU	1 205,5	7,3	44,9
SK	8,2	6,4	43,6
PL	20,2	6,4	39,4
LT	16,3	3,1	31,3
RO*	1,1	2,9	30,4
EE	3,8	4,0	29,0
LV	2,4	3,4	28,3

* Data on Romania in 1996

Source: Eurostat, UniCredit Research

¹ We have not included Bulgaria in our sample as the productivity data for that country range only 2000-2006.

The Table 2. shows that the Czech Republic was the productivity leader in CEE countries in 1995 reaching 56.6% of the EU(15) level when productivity is calculated using PPP followed by Slovenia (55.3%) and Hungary (44.9%). Slovakia's productivity level was 43.6% of EU(15) while that of Poland 39.4%. The lowest productivity level was reported in Estonia (29.0%) and Latvia (28.3%).

As already mentioned, at the onset of transition, labor productivity in CEE countries lagged significantly behind that in EU(15). The reasons were manifold. While the gap in quality of education was not as large, workers in CEE countries had to work with much lower quality capital stock than their counterparts in Western Europe. Furthermore, managerial, organizational and institutional deficiencies in the early transforming economies were rampant.

The following two tables portray that CEE countries have travelled a long path since the mid-1990's substantially reducing the productivity gap vis-à-vis the developed West. According to Table 2., while in 1995, Czech Republic, the CEE leader in productivity reached less than 57 % of EU (15) productivity, Slovakia - leader in 2009 - has reached more than 74% of the productivity of old member states of EU (calculated using PPP). Two following countries, Slovenia and Czech Republic have also labor productivity level above 70% in 2009. Even the countries at the bottom of the table made a substantial progress - the productivity in Baltic states were 48.9-55.8% of EU(15) and Romania had 44.4% of the productivity level of the EU (15).

Table 2. Aggregate labor productivity in 2009

	2009		EU15=100 PPP
	ths. LC	ths. EUR	
EU15	54,7	54,7	100,0
SK	26,0	26,0	74,3
SI	31,3	31,3	72,4
CZ	655,6	24,8	70,6
HU	5 518,5	19,7	62,7
PL	75,6	17,5	59,2
EE	19,9	19,9	55,8
LT	58,5	16,9	53,1
LV	12,0	17,1	48,9
RO*	49,0	13,3	44,4

*Data on Romania as of 2008

Source: Eurostat, UniCredit Research

It is also instructive to look at the data to see which countries have reported the fastest productivity growth during 1995-2009 time period. In order to calculate that, we used the aggregate value added in constant 2000 prices divided by total employed labor in each year. The Table 3 reports both the cumulative growth of the real aggregate productivity as well the compound annual growth rate during the time period. Additionally, it also shows how the CEE countries climbed the productivity ladder vis-à-vis EU (15) since 1995.

Table3. Aggregate productivity growth – cumulative and annual
(local currency, constant prices)

	2009/1995	CAGR 1995-	EU15=100 PPP		
		2009	1995	2009	0 2009-1995
EU15	11,4%	0,8%	100	100	0
EE	105,5%	5,3%	29,0	55,8	26,8
LT	97,5%	5,0%	31,3	53,1	21,8
LV	91,6%	4,8%	28,3	48,9	20,6
PL	88,7%	4,6%	39,4	59,2	19,8
SK	74,3%	4,0%	43,6	74,3	30,7
RO*	49,1%	3,4%	30,4	44,4	14,0
SI	49,9%	2,9%	55,3	72,4	17,2
CZ	47,9%	2,8%	56,6	70,6	14,0
HU	43,1%	2,6%	44,9	62,7	17,8

*Data on Romania 1996-2008

CAGR – compound annual growth rate

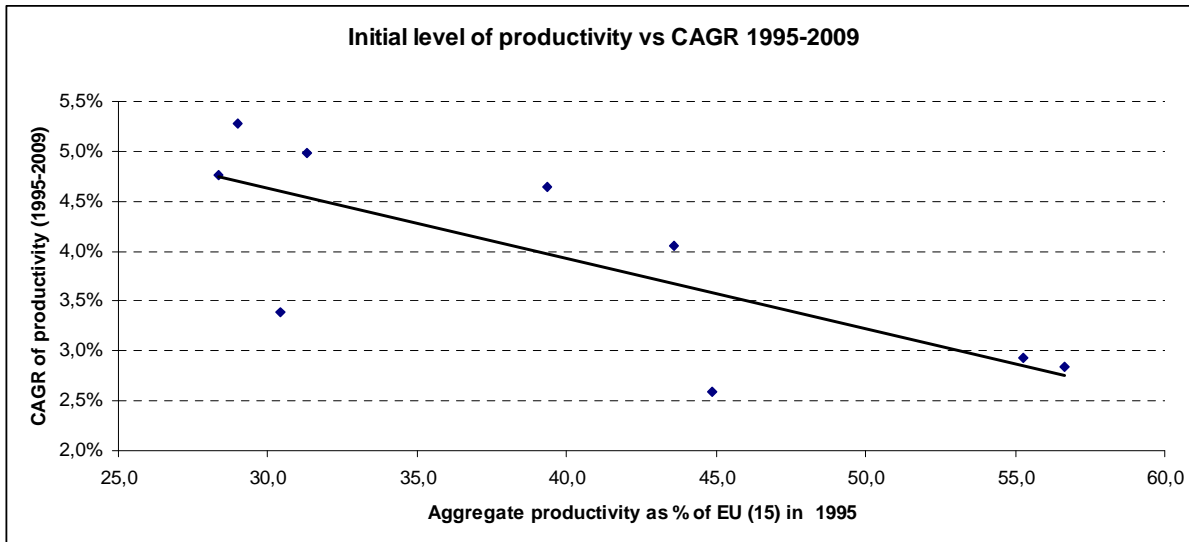
Source: Eurostat, UniCredit Research

This table documents that the convergence process was widespread – all countries in the sample have reduced the productivity gap vis-à-vis the old member states. This is because the growth rate of productivity in the Central Eastern Europe was much faster than in the West. While the aggregate labor productivity in EU (15) grew with CAGR of 0.8% during 1995-2009 even the CEE country with slowest growing productivity, Hungary, reported a growth of labor productivity of 2.6% during the same time period.

The Baltic states reported the highest real growth of aggregate productivity – Estonia and Lithuania both above 5%, Latvia 4.8%. Interestingly, the inspection of the data reveals that, broadly, the countries which started at the lowest level of productivity reported the

highest productivity growth and vice-versa showing convergence at work. The graph 1. shows the negative correlation between the initial level of productivity and the subsequent productivity growth.

Graph 1. Initial level of productivity vs. subsequent growth



Source: Eurostat, UniCredit Research

We have split the entire time period into a three sub-periods to see whether we could identify different productivity growth tempos during the following three subperiods : 1995-2003, 2004-2008, and 2009. Our hypothesis was that during the boom years of 2004-8 which coincided with a admission in the EU, productivity growth would be faster. Naturally, we expected a negative productivity growth for most countries during the crisis year 2009.

Table 4. Productivity growth rates by sub-periods

	CAGR			
	1995-2009	1995-2003	2004-2008	2009
EU15	0,8%	1,0%	1,0%	-2,6%
EU9	3,7%	3,6%	5,1%	-2,1%
EE	5,3%	7,7%	3,8%	-5,5%
LT	5,0%	6,3%	5,8%	-8,6%
LV	4,8%	5,7%	4,8%	-2,8%
PL	4,6%	5,0%	4,8%	1,5%
SK	4,0%	4,0%	5,6%	-2,8%
RO	3,4%	0,7%	7,3%	n.a.
SI	2,9%	3,9%	3,4%	-6,3%
CZ	2,8%	2,9%	4,2%	-4,1%
HU	2,6%	3,1%	3,2%	-4,3%

Source: Eurostat, UniCredit Research

The Table 4. shows the productivity growth rates during the three time periods. It reveals that during 2004-2008 productivity growth accelerated to 5.1% for EU(9) as a whole (from 3.6% in 1995-2003) with Romania (7.3%), Lithuania (5.8%) and Slovakia (5.6%) showing the highest growth rates. While it is hard to disentangle whether the acceleration was more due to the EU admission or boom years in the emerging markets in general, it is instructive to notice to the country that grew fastest, Romania, became an EU member only in 2007. Also, the inspection of individual country data reveals that in five out of nine countries labor productivity growth slowed down in the 2004-2008 period (vis-à-vis 1995-2003).

IV. Sector productivity levels

In this section, we will investigate the productivity levels of various sectors both within countries and at the aggregate EU(9) level. First, we would like to learn more about *levels* of productivity in each country both in 1995 and in 2009. Differences in productivity levels in the mid 1990's open up a room for economy-wide increases in productivity due to structural reallocation of labor among sectors (more on that in Section VI). We would also like to find out the gap between the productivity of individual sectors vis-à-vis the same sectors in EU (15) both in the mid-1990's and now. We have grouped the sectors into five broad categories²: agriculture, other industries, manufacturing, market services and non-market services. For each broad category we have calculated average productivity level in both EU(9) and EU(15) groups and at the country level.

Details on the sector productivity levels on the country level are reported in the Appendix. In the main body of the paper, we report the productivity levels of various sectors in Table 5 for EU(9) and EU (15). According to the Table 4, financial intermediation and real estate and business activities have been the most productive sectors in EU(9) region in 1995 - the productivity there was about 2.7x higher than the average productivity in the EU(9)

² Grouping of sectors in broad categories is in line with M.P.Timmer, G.J. de Vries – Structural change and growth acceleration in Asia ad Latin America: a news sectoral data set, *Cliometrica* (2009) 3: 165-190

economy. Other high productivity sectors in EU (9) were utilities (199%), public administration (164.4%) and mining (120%). On the other side of the spectrum were agriculture (40.7%), health & social work (55.6%) and education (64.7%). In 2009, the highest productivity sectors were utilities (251.9%), real estate & business activities (205.6%) and financial intermediation (194.5%). The least productive were workers in agriculture (27.5%), education (67.4%) and health & social work (69.9%).

Table. 5 Sector productivities vis-à-vis the average productivity
(current prices converted to PPP)

	EU-9		EU-15	
	1995	2009	1995	2009
Agriculture	40,7%	27,5%	54,0%	43,9%
Mining	119,5%	135,5%	263,4%	367,6%
Manufacturing	97,0%	96,8%	106,7%	100,7%
Utilities	198,5%	251,9%	312,4%	381,4%
Construction	100,9%	94,6%	81,4%	88,4%
Trade	113,2%	101,6%	76,1%	72,5%
Hotels & Restaurants	95,8%	61,6%	60,0%	60,7%
Transport & Comm.	120,1%	135,8%	116,5%	116,0%
Financial Intermediation	275,0%	194,5%	159,9%	200,8%
Real Estate & Business Activities	273,6%	205,6%	201,8%	168,6%
Public Administration	164,4%	106,0%	94,0%	97,8%
Education	64,7%	67,4%	72,9%	78,3%
Health & Social Work	55,6%	69,9%	69,0%	73,6%
Other Services	119,3%	112,8%	64,6%	62,0%
Agriculture	40,7%	27,5%	54,0%	43,9%
Manufacturing	97,0%	96,8%	106,7%	100,7%
Other Industries	123,6%	120,7%	109,7%	118,4%
Market Services	149,2%	133,9%	119,4%	117,7%
Non-market Services	89,9%	86,1%	75,4%	77,0%

Source: Eurostat, UniCredit Research

Note: Other services are other community, social and personal service activities + activities of households + extra-territorial organizations and bodies

Looking at the groups of sectors, market services report the highest productivity in 2009 – 133.9% of the EU(9) economy average – followed by other industries (120.7%), manufacturing (96.8%), non-market services (86.1%) and agriculture (27.5%). Interestingly, the EU(9) relative sector differences in 2009 among grouped sectors broadly resemble those of EU (15).

The Table 6. reports sector productivity of EU (9) in 1995 and 2009 in proportion of EU(15) productivity in individual sectors. Inspection of 1995 data suggests that relatively most productive sectors were other services (73.4% of Western productivity), public administration (69.5%) and financial intermediation (68.4%). The least productive - in relation to the Western counterparts - were mining (18%), utilities (25.3%) and agriculture (30%).

Table 6. Sector productivity as % of EU (15) productivity

	EU15 = 100		
	1995	2009	0
Agriculture	30,0	36,4	6,4
Mining	18,0	21,4	3,3
Manufacturing	36,2	55,7	19,6
Utilities	25,3	38,3	13,0
Construction	49,3	62,0	12,7
Trade	59,2	81,3	22,2
Hotels & Restaurants	63,6	58,9	-4,7
Transport & Comm.	41,0	67,9	26,9
Financial Intermediation	68,4	56,2	-12,2
Real Estate & Business Activities	53,9	70,7	16,8
Public Administration	69,5	62,8	-6,7
Education	35,3	49,9	14,6
Health & Social Work	32,0	55,1	23,1
Other Services	73,4	105,6	32,1
Agriculture	30,0	36,4	6,4
Manufacturing	36,2	55,7	19,6
Other Industries	44,8	59,1	14,4
Market Services	49,7	66,0	16,3
Non-market Services	47,4	64,8	17,4

Source: Eurostat, UniCredit Research

In 2009, the most productive were again workers in other services (105.6%) – they even surpassed their Western counterparts - trade (81.3%) and real estate & business activities (70.7%). Eastern European workers were relatively least productive in mining (21.4%), agriculture (36.4%) and utilities (38.3). As for groups of sectors, the productivity gap was lowest in the market services (66% of WE levels), non-market services (64.8%) and other industries (59.1%). In the two traditional sectors - agriculture and manufacturing - the gap was widest.

Interestingly, at the aggregate EU (9) level, most sectors were closing productivity gaps to Western levels. The biggest leap was done by other services (32.1ppts), transport &

communication (26.9ppts) and health& social work (23.1ppts). The only sectors which regressed in relative productivity were hotels & restaurants (-4.7 ppts), public administration (-6.7 ppts) and financial intermediation (-12.2ppts). Looking at groups of sectors - they all were closing the gap with the highest speed in manufacturing (19.6 ppts) and non-market services (17.4ppts). On the aggregate EU (9) level, agriculture showed only a relatively weak relative outperformance (but this was also because there was a substantial productivity growth in Western European agriculture during the time period).

V. Sector productivity growth

Using real value added in constant prices in local currency converted by 2000 PPP exchange rates, we have also calculated growth rates of individual sectors at the aggregate EU (9) level and at the country level to see which sectors were most dynamic during 1995-2009 time period. The Table 7. reports the sector productivity growth rates for the EU(9) region and casts it in comparison with the EU(15). The Appendix contains country level data.

Table 7. Sector productivity growth rates

(constant 2000 prices converted by 2000 PPP exchange rates)

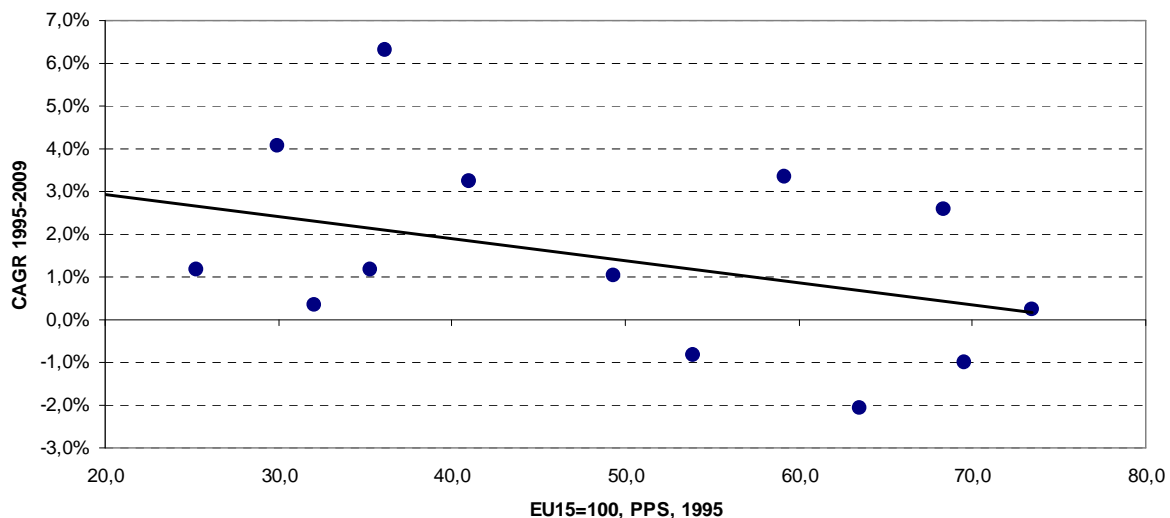
	EU9		EU15	
	2009/1995	CAGR 1995-2009	2009/1995	CAGR 1995-2009
TOTAL	67,0%	3,7%	11,4%	0,8%
Agriculture	75,2%	4,1%	47,1%	2,8%
Mining	35,8%	2,2%	14,8%	1,0%
Manufacturing	135,8%	6,3%	23,7%	1,5%
Utilities	17,6%	1,2%	30,5%	1,9%
Construction	15,3%	1,0%	-5,0%	-0,4%
Trade	58,1%	3,3%	13,1%	0,9%
Hotels & Restaurants	-25,4%	-2,1%	-7,3%	-0,5%
Transport & Comm.	56,1%	3,2%	37,0%	2,3%
Financial Intermediation	43,2%	2,6%	45,7%	2,7%
Real Estate & Business Activities	-10,9%	-0,8%	-11,4%	-0,9%
Public Administration	-13,1%	-1,0%	-21,1%	-1,7%
Education	17,6%	1,2%	21,2%	1,4%
Health & Social Work	4,9%	0,3%	19,1%	1,3%
Other Services	3,3%	0,2%	-1,6%	-0,1%
Agriculture	75,2%	4,1%	47,1%	2,8%
Manufacturing	135,8%	6,3%	23,7%	1,5%
Other Industries	13,4%	0,9%	-2,1%	-0,2%
Market Services	32,2%	2,0%	11,3%	0,8%
Non-market Services	7,6%	0,5%	-2,9%	-0,2%

Source: Eurostat, UniCredit Research

Several facts from the table are worth noting. The sectors in EU(9) with fastest growing productivity were manufacturing (CAGR of 6.3%), agriculture (4.1%) and trade (3.3%). The three sectors which saw negative productivity growth rates were hotels & restaurants (-2.1%), public administration (-1.0%) and real estate & business activities (-0.8%). Looking at groups of sectors, two traditional branches of the economy - agriculture and manufacturing - experienced the fastest growth followed by market services (2.0%). This picture is to a large extent similar to EU (15) which during the time period also saw the highest productivity growth rates in the two traditional sectors - agriculture (2.8%) and manufacturing (1.5%).

We have plotted the growth rates of the individual sectors in EU (9) during 1995-2009 against their initial level of productivity vis-à-vis Western European sectors to see whether we detect signs of convergence. Should convergence be at work, we would predict that sectors where the productivity gap was largest would grow faster than sectors which were closer to the productivity frontier. The graph 2. indeed tends to suggest that sectors which started as low-productivity sectors grew on average faster than the sectors where the productivity gap was not as large.

Graph. 2. Initial level of sector productivity (as % of WE level) vs growth rate of the sectors



Source: Eurostat, UniCredit Research

We have repeated the correlation exercise searching for signs of convergence within the five groups of sectors and the fourteen sectors across the CEE countries. For each group of sectors/sector there were nine country data points. The reducing of productivity gap with a negative correlation between the initial productivity relative to the West and subsequent productivity growth was documented in four out of five groups of sectors and in ten out of fourteen sectors. ³Agriculture is the sole exception where this negative correlation does not hold⁴.

Next, we decompose the labor productivity growth into a growth of value added and employment growth for both EU(9) and EU (15) regions. Similar decomposition was done at the country level and is available in the Appendix.

Table. 8 Decomposition of labor productivity growth into VA and employment growth

	EU (9) CAGR 1995-2009			EU (15) CAGR 1995-2009		
	Labour productivity	Value added	Employment	Labour productivity	Value added	Employment
TOTAL	3,7%	3,9%	0,2%	0,8%	1,8%	1,0%
Agriculture	4,1%	0,9%	-3,1%	2,8%	1,0%	-1,8%
Mining	2,2%	-2,7%	-4,8%	1,0%	-1,8%	-2,8%
Manufacturing	6,3%	5,7%	-0,6%	1,5%	0,5%	-1,0%
Utilities	1,2%	-0,5%	-1,6%	1,9%	1,3%	-0,6%
Construction	1,0%	3,3%	2,3%	-0,4%	0,3%	0,7%
Trade	3,3%	5,2%	1,8%	0,9%	1,7%	0,8%
Hotels & Restaurants	-2,1%	0,3%	2,4%	-0,5%	1,7%	2,3%
Transport & Comm.	3,2%	3,5%	0,2%	2,3%	3,2%	0,9%
Financial Intermediation	2,6%	4,7%	2,1%	2,7%	3,1%	0,4%
Real Estate & Business Activities	-0,8%	3,4%	4,2%	-0,9%	2,9%	3,8%
Public Administration	-1,0%	2,8%	3,8%	-1,7%	-1,7%	0,0%
Education	1,2%	2,0%	0,8%	1,4%	2,6%	1,2%
Health & Social Work	0,3%	0,3%	0,0%	1,3%	3,5%	2,2%
Other Services	0,2%	2,4%	2,1%	-0,1%	2,1%	2,2%
Agriculture	4,1%	0,9%	-3,1%	2,8%	1,0%	-1,8%
Manufacturing	6,3%	5,7%	-0,6%	1,5%	0,5%	-1,0%
Other Industries	0,9%	1,5%	0,6%	-0,2%	0,3%	0,5%
Market Services	2,0%	4,0%	1,9%	0,8%	2,6%	1,8%
Non-market Services	0,5%	2,0%	1,5%	-0,2%	1,3%	1,5%

Source: Eurostat, UniCredit Research

Inspection of the data in the Table 8. reveals that sectors which were most absorbing labor in EU(9) as a whole were real-estate & business activities (CAGR 4.2%), public administration (3.8%) and hotels & restaurants (2.4%) – the three sectors which also saw a negative productivity growth. Sectors which both increased productivity and generated

³ The correlation was tightest in case of market services

⁴ Three sectors – hotels and restaurants, public administration, financial intermediation – did not reduce the productivity gap but there was a negative relationship between the starting level of productivity and the subsequent growth.

jobs are construction, trade, transport & communication, financial intermediation and several non-market services. Looking at the bottom panel, this shows that two traditional sectors - agriculture and manufacturing - released labor which got allocated to market services, non-market services and other industries. This has inflated productivity gains in the two traditional sectors while depressed it in the other three groups. Qualitatively, the picture is not too different for EU (15) where agriculture and manufacturing released labor while the other three branches of the economy generated jobs on net

VI. Within sectors productivity growth vs. structural re-allocation⁵

The labor productivity in the economy can grow in two ways. First, through higher productivity in each sector such as due to capital deepening, know-how transfer or exit of non-performing plants. Secondly, labor resources may flow from low-productivity sectors to high-productivity sectors boosting aggregate labor productivity. In other words, it is possible to increase/decrease a labor productivity of the whole economy while the growth of sector productivity in each sector of the economy is zero. This is because the productivity levels in the economy are uneven - we can increase (or decrease) the productivity of the whole economy by re-allocating labor into higher (lower) productivity sectors.

We have also decomposed the productivity growth in the individual countries during the 1995-2009 time period into “within sector” productivity growth and structural re-allocation effect. The decomposition was done in the following way:

$$\Delta Y_t = \sum_{i=1}^n \theta_{i,t-k} \Delta y_{i,t} + \sum_{i=1}^n y_{i,t} \Delta \theta_{i,t}$$

Y_t is aggregate labor productivity, $y_{i,t}$ is sector productivity level. $\theta_{i,t}$ is the share of employment in sector i . The first term in the equation is the weighted sum of productivity growth in individual sectors with weights being the employment shares at the beginning time period ($t-k$). This is *within* component of the productivity growth. The second term is re-allocation effect - it is the inner product of productivity levels at the end of the time period with the delta of employment shares across sectors. Intuitively, when employment

⁵ This section is based on the framework from M. McMillan, D. Rodrik: Globalization, structural change and productivity growth (2011), NBER working paper

changes will be correlated with productivity *levels*, this term will be positive hence structural change will result in an increase in total productivity growth.

Table 9. Decomposition of labor productivity growth

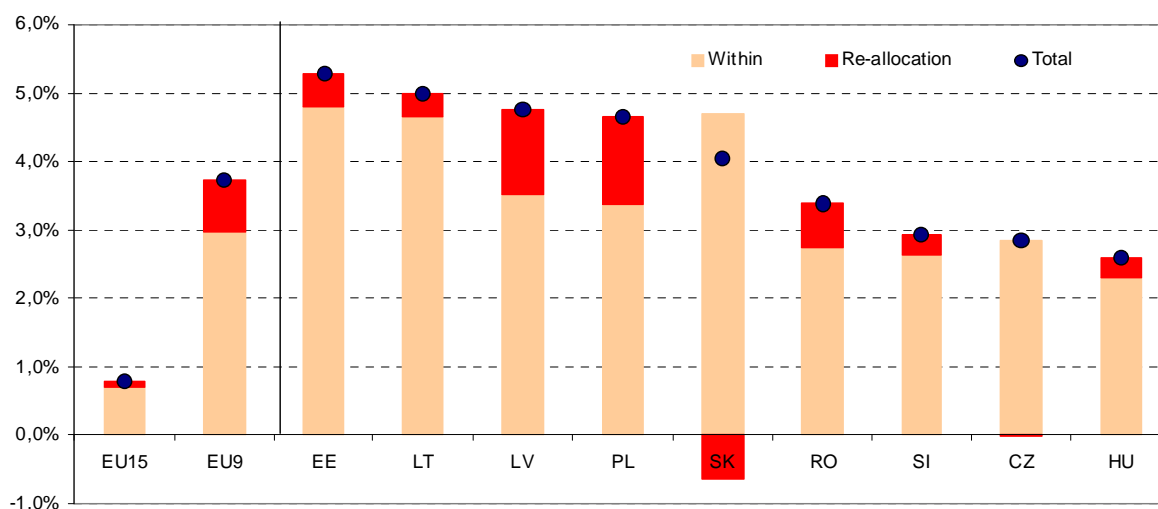
(constant PPP prices)

	Labour productivity CAGR 1995-2009		
	Total	Within	Re-allocation
EU15	0,8%	0,7%	0,1%
EU9	3,7%	3,0%	0,8%
EE	5,3%	4,8%	0,5%
LT	5,0%	4,7%	0,3%
LV	4,8%	3,5%	1,2%
PL	4,6%	3,4%	1,3%
SK	4,0%	4,7%	-0,6%
RO	3,4%	2,7%	0,7%
SI	2,9%	2,6%	0,3%
CZ	2,8%	2,8%	0,0%
HU	2,6%	2,3%	0,3%

Source: Eurostat, UniCredit Research

The Table 8 reports the results of the decomposition exercise for all individual EU(9) countries, EU (9) and EU (15) as a whole. They show that the total 3.7% labor productivity growth during 1995-2009 can be broken down to within sector productivity growth of 3.0% and structural re-allocation effect of 0.7%. The latter is due to shift of labor from lower productivity sectors such as agriculture to higher value added sectors. Data thus seem to suggest that most of the labor productivity growth in CEE countries was generated by labor productivity growth within sectors. The glance at growth contributions from the sector re-allocation at the country level reveals that Poland (1.3ppt), followed by Lithuania (1.2ppt) and Romania (0.7ppt) benefitted most from the sectoral adjustment. The only country where sector re-allocation effect was negative was Slovakia with -0.6 ppt.

Graph. 3 Decomposition of labor productivity growth



Source: Eurostat, UniCredit Research

We have also asked ourselves a following question: What would be the productivity level of each EU(9) country if it adopted the sector structure of the developed Western countries? By how much would it narrow the productivity gap vis-à-vis the EU(15)? We have then calculated the overall productivity of all EU (9) countries using EU(15) sector labor weights.

The results are reported in the Table 10. The data suggests that the potential upside is large only for Romania (46.9% potential increase in productivity) and Poland (13.1%); for all other countries the induced growth in productivity is only in single-digit levels (and negative for the Czech Republic).

Table. 10 Extra - productivity growth induced by EU(15) economic structure

	Labour productivity , ths. PPS					
	2009	"Optimal" structure	Growth induced by "optimal" structure	EU15 = 100 2009	"Optimal" structure	(
EU9	30,0	33,6	11,9%	58,0	64,9	6,9
RO	23,9	35,1	46,9%	46,2	67,9	21,7
PL	30,6	34,6	13,1%	59,2	66,9	7,7
HU	32,4	35,1	8,2%	62,7	67,8	5,1
LT	27,4	29,4	7,0%	53,1	56,8	3,7
SI	37,5	39,8	6,4%	72,4	77,0	4,6
EE	28,8	30,5	5,7%	55,8	59,0	3,2
LV	25,3	26,7	5,6%	48,9	51,6	2,7
SK	38,4	39,2	2,1%	74,3	75,9	1,6
CZ	36,5	34,0	-7,0%	70,6	65,7	-4,9

Source: Eurostat, UniCredit Research

VII. Conclusion

In this paper, we calculate aggregate and sector productivity levels and growth rates in CEE countries during the time period 1995-2009. We conduct various comparisons with the developed countries in West Europe at the aggregate as well as sector level.

We found that market services and other industries report the highest productivity levels when comparison is made within the EU(9) universe. When comparing to EU(15), productivity in market and non-market services is relatively highest i.e. the productivity gaps between the East and West narrowest. Two traditional sectors – manufacturing and agriculture – have seen the highest productivity growth during the time period 1995-2009, both in CEE as a region and in all individual CEE countries⁶. This is also because in all CEE countries in our sample agriculture and manufacturing reduced the absolute number of workers employed during the time period 1995-2009. The picture from Western Europe is perhaps surprisingly similar.

Although, manufacturing sector has seen sharp productivity gains during the time period 1995-2009 it still lags significantly behind the Western levels. In overwhelming majority of countries, including the most advanced EU(9) countries, the productivity of manufacturing is still the lowest or second lowest (after agriculture) from among the five groups of sectors. While this may be disappointing at a first glance, it suggests a potential for further rapid productivity growth in the future.

The story that comes out of this paper is also one of convergence. All countries on which this paper focuses have seen aggregate productivity increases during the last 15 years which allowed them to reduce the productivity gap vis-a-vis Western European countries. This has allowed them to increase their income levels closer to those prevailing in the West and elevate their standards of living. In general, the countries with lower initial aggregate productivity had reported higher growth of productivity and vice-versa showing convergence at work.

⁶ The only exception is Romania where agriculture has reported a relatively low productivity growth

Some signs of convergence are also visible at the sectoral level. First, all five groups of sectors reduced the productivity gap vis-à-vis EU(15) during the time period. This holds both at the aggregate EU (9) level and individual country level⁷. Second, evidence on the EU(9) level shows that sectors where productivity gap was the widest in 1995 tended to grow fastest and vice-versa. This also applies to two traditional sectors -agriculture and manufacturing - which saw very high productivity growth rates in EU(9) during 1995-2009 starting at a low productivity level compared to the West. Last but not least, convergence - narrowing a productivity gap with a negative correlation between the starting level and subsequent productivity growth - was documented in four out of five groups of sectors and ten out of fourteen sectors (agriculture being the sole exception where this negative correlation does not hold).

We have also decomposed the productivity growth in the individual countries during the 1995-2009 time period into “within sector” productivity growth and structural re-allocation effect. The results suggest that most of the labor productivity growth occurred within sectors rather than through sector re-allocation. In all except one case (Slovakia), the re-allocation effect ran in the right direction.

We have also conducted a thought experiment when we attempted to gauge the potential productivity growth from adopting the “Western” economic structure. The data suggests that the potential upside is large only for Romania (46.9% potential increase in productivity) and Poland (13.1%) for all other countries the induced growth in productivity is only at single-digit levels (and negative for the Czech Republic). This may perhaps suggest that the advanced CEE countries have moved relatively close to Western economic structures and most of future productivity gains will likely have to come from within the sectors rather than from sectoral re-allocation.

⁷ With the sole exception of agriculture in Romania.

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APPENDIX

A1 Sector productivities vis-à-vis the average productivity

(current prices converted to PPP)

SK		CZ		PL				
	1995	2009	1995	2009	1995	2009		
Agriculture	66.0%	125.8%	Agriculture	74.2%	60.8%	Agriculture	30.7%	27.2%
Mining	108.8%	162.8%	Mining	109.1%	115.0%	Mining	145.8%	157.1%
Manufacturing	98.4%	87.9%	Manufacturing	84.1%	86.2%	Manufacturing	100.2%	94.0%
Utilities	247.5%	385.2%	Utilities	311.7%	489.7%	Utilities	190.7%	234.8%
Construction	72.9%	110.4%	Construction	63.1%	76.1%	Construction	118.1%	91.5%
Trade	114.8%	84.4%	Trade	71.4%	78.9%	Trade	146.6%	122.2%
Hotels & Restaurants	64.9%	46.1%	Hotels & Restaurants	87.1%	47.7%	Hotels & Restaurants	71.6%	58.1%
Transport & Comm.	138.6%	103.3%	Transport & Comm.	143.0%	144.1%	Transport & Comm.	109.5%	116.8%
Financial Intermediation	412.1%	234.5%	Financial Intermediation	198.4%	213.1%	Financial Intermediation	148.4%	164.2%
Real Estate & Business Activities	215.2%	159.5%	Real Estate & Business Activities	168.2%	118.5%	Real Estate & Business Activities	260.8%	209.4%
Public Administration	80.6%	105.3%	Public Administration	90.5%	94.4%	Public Administration	258.9%	94.2%
Education	37.2%	46.1%	Education	72.6%	74.7%	Education	77.4%	63.3%
Health & Social Work	54.6%	57.7%	Health & Social Work	63.3%	72.7%	Health & Social Work	47.5%	65.5%
Other Services	54.0%	108.7%	Other Services	75.0%	70.9%	Other Services	184.8%	139.5%
Agriculture	66.0%	125.8%	Agriculture	74.2%	60.8%	Agriculture	30.7%	27.2%
Manufacturing	98.4%	87.9%	Manufacturing	84.1%	86.2%	Manufacturing	100.2%	94.0%
Other Industries	110.8%	150.2%	Other Industries	99.4%	119.9%	Other Industries	138.6%	120.3%
Market Services	151.3%	109.1%	Market Services	115.0%	105.8%	Market Services	151.7%	138.5%
Non-market Services	54.7%	75.0%	Non-market Services	75.7%	78.8%	Non-market Services	106.3%	83.6%

HU		SI		RO				
	1995	2009	1995	2009	1996	2008		
Agriculture	54.1%	46.7%	Agriculture	31.2%	28.8%	Agriculture	52.3%	24.9%
Mining	53.3%	115.7%	Mining	98.0%	133.4%	Mining	93.5%	100.4%
Manufacturing	95.5%	100.0%	Manufacturing	82.9%	90.1%	Manufacturing	110.5%	110.3%
Utilities	132.4%	217.2%	Utilities	168.9%	253.9%	Utilities	163.1%	136.3%
Construction	83.3%	58.7%	Construction	95.3%	88.0%	Construction	127.3%	152.4%
Trade	87.3%	81.9%	Trade	96.2%	100.4%	Trade	110.4%	95.6%
Hotels & Restaurants	70.9%	41.5%	Hotels & Restaurants	74.5%	66.3%	Hotels & Restaurants	211.1%	130.8%
Transport & Comm.	94.9%	110.9%	Transport & Comm.	119.9%	116.1%	Transport & Comm.	139.0%	210.8%
Financial Intermediation	211.8%	195.7%	Financial Intermediation	297.1%	204.8%	Financial Intermediation	618.7%	238.1%
Real Estate & Business Activities	396.7%	235.4%	Real Estate & Business Activities	224.9%	153.0%	Real Estate & Business Activities	371.3%	338.2%
Public Administration	123.8%	121.6%	Public Administration	146.0%	121.0%	Public Administration	185.8%	114.1%
Education	64.0%	58.6%	Education	98.9%	89.4%	Education	43.7%	91.0%
Health & Social Work	77.1%	65.6%	Health & Social Work	107.4%	101.7%	Health & Social Work	36.1%	73.5%
Other Services	115.9%	100.2%	Other Services	121.1%	89.0%	Other Services	88.1%	116.7%
Agriculture	54.1%	46.7%	Agriculture	31.2%	28.8%	Agriculture	52.3%	24.9%
Manufacturing	95.5%	100.0%	Manufacturing	82.9%	90.1%	Manufacturing	110.5%	110.3%
Other Industries	94.1%	86.6%	Other Industries	107.9%	109.2%	Other Industries	125.5%	144.3%
Market Services	136.5%	125.7%	Market Services	139.2%	124.0%	Market Services	184.5%	166.9%
Non-market Services	92.4%	84.7%	Non-market Services	115.9%	100.5%	Non-market Services	64.9%	97.3%

LV		LT		EE				
	1995	2009	1995	2009	1995	2009		
Agriculture	51.2%	37.6%	Agriculture	56.8%	36.0%	Agriculture	57.4%	64.7%
Mining	40.9%	133.1%	Mining	137.4%	140.3%	Mining	131.1%	119.7%
Manufacturing	101.5%	72.3%	Manufacturing	97.0%	99.0%	Manufacturing	84.7%	71.5%
Utilities	281.0%	269.9%	Utilities	174.1%	225.1%	Utilities	139.9%	262.1%
Construction	92.8%	83.6%	Construction	110.1%	72.3%	Construction	123.8%	82.9%
Trade	77.2%	80.9%	Trade	113.3%	94.5%	Trade	97.9%	88.3%
Hotels & Restaurants	50.6%	45.6%	Hotels & Restaurants	112.3%	57.0%	Hotels & Restaurants	51.7%	41.3%
Transport & Comm.	167.5%	125.5%	Transport & Comm.	130.6%	196.6%	Transport & Comm.	112.8%	132.2%
Financial Intermediation	384.7%	310.5%	Financial Intermediation	150.4%	144.3%	Financial Intermediation	202.8%	168.4%
Real Estate & Business Activities	267.0%	202.4%	Real Estate & Business Activities	299.3%	198.8%	Real Estate & Business Activities	337.2%	238.7%
Public Administration	122.3%	128.8%	Public Administration	193.1%	123.2%	Public Administration	89.8%	111.9%
Education	60.5%	69.5%	Education	44.0%	61.4%	Education	71.2%	50.3%
Health & Social Work	73.5%	64.6%	Health & Social Work	36.7%	61.5%	Health & Social Work	59.9%	71.9%
Other Services	58.6%	85.4%	Other Services	89.5%	68.8%	Other Services	61.9%	70.3%
Agriculture	51.2%	37.6%	Agriculture	56.8%	36.0%	Agriculture	57.4%	64.7%
Manufacturing	101.5%	72.3%	Manufacturing	97.0%	99.0%	Manufacturing	84.7%	71.5%
Other Industries	137.4%	111.4%	Other Industries	130.2%	97.9%	Other Industries	129.2%	110.8%
Market Services	142.0%	126.5%	Market Services	142.6%	134.7%	Market Services	139.9%	134.0%
Non-market Services	76.5%	87.3%	Non-market Services	78.8%	76.2%	Non-market Services	71.4%	73.1%

Source: Eurostat, UniCredit Research

A2 Sector productivity as % of EU (15) productivity

SK				CZ				PL			
	EU15 = 100			EU15 = 100			EU15 = 100			€	
	1995	2009	J	1995	2009	□	1995	2009	□		
Agriculture	53,3	213,1	159,9	Agriculture	77,8	98,0	20,2	Agriculture	22,3	36,7	14,3
Mining	18,0	32,9	14,9	Mining	23,5	22,1	-1,4	Mining	21,8	25,3	3,5
Manufacturing	40,2	64,8	24,6	Manufacturing	44,6	60,5	15,9	Manufacturing	37,0	55,2	18,2
Utilities	34,5	75,0	40,5	Utilities	56,5	90,7	34,2	Utilities	24,0	36,4	12,4
Construction	39,0	92,8	53,7	Construction	43,9	60,8	16,8	Construction	57,2	61,2	4,1
Trade	65,7	86,5	20,8	Trade	53,2	76,9	23,8	Trade	75,9	99,7	23,9
Hotels & Restaurants	47,1	56,3	9,2	Hotels & Restaurants	82,3	55,5	-26,8	Hotels & Restaurants	47,0	56,6	9,6
Transport & Comm.	51,8	66,2	14,4	Transport & Comm.	69,5	87,8	18,3	Transport & Comm.	37,0	59,6	22,6
Financial Intermediation	112,3	86,8	-25,6	Financial Intermediation	70,3	75,0	4,7	Financial Intermediation	36,5	48,4	11,8
RE & Business Activities	46,5	70,3	23,8	RE & Business Activities	47,2	49,7	2,4	RE & Business Activities	50,9	73,4	22,6
Public Administration	37,3	80,0	42,7	Public Administration	54,5	68,2	13,7	Public Administration	108,4	57,0	-51,4
Education	22,3	43,7	21,5	Education	56,4	67,4	11,0	Education	41,8	47,8	6,0
Health & Social Work	34,5	58,2	23,7	Health & Social Work	52,0	69,8	17,8	Health & Social Work	27,1	52,7	25,6
Other Services	36,4	130,4	94,0	Other Services	65,7	80,8	15,1	Other Services	112,7	133,1	20,5
Agriculture	53,3	213,1	159,9	Agriculture	77,8	98,0	20,2	Agriculture	22,3	36,7	14,3
Manufacturing	40,2	64,8	24,6	Manufacturing	44,6	60,5	15,9	Manufacturing	37,0	55,2	18,2
Other Industries	44,0	94,2	50,2	Other Industries	51,3	71,5	20,2	Other Industries	49,7	60,1	10,4
Market Services	55,2	68,9	13,7	Market Services	54,5	63,5	9,0	Market Services	50,0	69,6	19,6
Non-market Services	31,6	72,3	40,7	Non-market Services	56,8	72,3	15,5	Non-market Services	55,5	64,2	8,7

HU				SI				RO			
	EU15 = 100			EU15 = 100			EU15 = 100			€	
	1995	2009	□	1995	2009	□	1996	2008	□		
Agriculture	44,9	66,8	21,9	Agriculture	31,9	47,5	15,6	Agriculture	28,3	23,6	-4,7
Mining	9,1	19,7	10,6	Mining	20,6	26,3	5,7	Mining	10,8	9,6	-1,2
Manufacturing	40,2	62,2	22,0	Manufacturing	42,9	64,7	21,8	Manufacturing	31,7	45,2	13,6
Utilities	19,0	35,7	16,7	Utilities	29,9	48,2	18,3	Utilities	15,0	15,5	0,6
Construction	46,0	41,6	-4,3	Construction	64,7	72,1	7,3	Construction	48,4	79,1	30,6
Trade	51,5	70,9	19,4	Trade	69,9	100,4	30,5	Trade	44,5	57,5	13,0
Hotels & Restaurants	53,1	42,8	-10,2	Hotels & Restaurants	68,6	79,1	10,4	Hotels & Restaurants	106,0	97,3	-8,7
Transport & Comm.	36,5	60,0	23,5	Transport & Comm.	56,9	72,5	15,6	Transport & Comm.	36,6	79,1	42,4
Financial Intermediation	59,5	61,1	1,6	Financial Intermediation	102,7	73,9	-28,9	Financial Intermediation	114,3	56,4	-57,9
RE & Business Activities	88,3	87,5	-0,7	RE & Business Activities	61,6	65,7	4,1	RE & Business Activities	56,8	90,9	34,1
Public Administration	59,1	78,0	18,8	Public Administration	85,8	89,6	3,7	Public Administration	59,8	54,1	-5,7
Education	39,4	46,9	7,5	Education	75,1	82,7	7,7	Education	18,1	53,6	35,5
Health & Social Work	50,2	55,9	5,8	Health & Social Work	86,1	100,1	13,9	Health & Social Work	15,9	45,4	29,5
Other Services	80,6	101,4	20,8	Other Services	103,6	104,1	0,4	Other Services	41,6	85,5	43,8
Agriculture	44,9	66,8	21,9	Agriculture	31,9	47,5	15,6	Agriculture	28,3	23,6	-4,7
Manufacturing	40,2	62,2	22,0	Manufacturing	42,9	64,7	21,8	Manufacturing	31,7	45,2	13,6
Other Industries	38,5	45,9	7,4	Other Industries	54,4	66,8	12,4	Other Industries	34,7	54,8	20,2
Market Services	51,3	67,0	15,7	Market Services	64,4	76,3	11,9	Market Services	47,0	63,7	16,7
Non-market Services	55,0	69,0	14,0	Non-market Services	84,9	94,5	9,6	Non-market Services	26,1	57,8	31,7

LV				LT				EE			
	EU15 = 100			EU15 = 100			EU15 = 100			€	
	1995	2009	π	1995	2009	€	1995	2009	€		
Agriculture	26,8	41,9	15,1	Agriculture	32,9	43,6	10,7	Agriculture	30,8	82,3	51,5
Mining	4,4	17,7	13,3	Mining	16,3	20,3	3,9	Mining	14,4	18,2	3,7
Manufacturing	26,9	35,1	8,1	Manufacturing	28,4	52,1	23,7	Manufacturing	23,0	39,6	16,6
Utilities	25,5	34,6	9,1	Utilities	17,4	31,3	13,9	Utilities	13,0	38,3	25,4
Construction	32,3	46,3	13,9	Construction	42,4	43,4	1,0	Construction	44,1	52,3	8,2
Trade	28,8	54,6	25,8	Trade	46,6	69,2	22,6	Trade	37,3	68,0	30,6
Hotels & Restaurants	23,9	36,7	12,8	Hotels & Restaurants	58,6	49,8	-8,8	Hotels & Restaurants	25,0	37,9	13,0
Transport & Comm.	40,7	52,9	12,2	Transport & Comm.	35,1	89,9	54,9	Transport & Comm.	28,1	63,6	35,5
Financial Intermediation	68,2	75,6	7,4	Financial Intermediation	29,4	38,1	8,7	Financial Intermediation	36,8	46,8	10,0
RE & Business Activities	37,5	58,7	21,2	RE & Business Activities	46,4	62,6	16,1	RE & Business Activities	48,4	78,9	30,5
Public Administration	36,8	64,4	27,6	Public Administration	64,2	66,8	2,6	Public Administration	27,7	63,8	36,1
Education	23,5	43,4	19,9	Education	18,9	41,6	22,7	Education	28,3	35,8	7,5
Health & Social Work	30,2	42,9	12,7	Health & Social Work	16,6	44,3	27,7	Health & Social Work	25,2	54,5	29,3
Other Services	25,7	67,4	41,7	Other Services	43,4	58,9	15,5	Other Services	27,8	63,3	35,5
Agriculture	26,8	41,9	15,1	Agriculture	32,9	43,6	10,7	Agriculture	30,8	82,3	51,5
Manufacturing	26,9	35,1	8,1	Manufacturing	28,4	52,1	23,7	Manufacturing	23,0	39,6	16,6
Other Industries	35,5	46,0	10,5	Other Industries	37,1	43,9	6,8	Other Industries	34,1	52,2	18,1
Market Services	33,7	52,6	18,9	Market Services	37,4	60,7	23,4	Market Services	34,0	63,5	29,6
Non-market Services	28,7	55,4	26,7	Non-market Services	32,7	52,5	19,8	Non-market Services	27,4	52,9	25,5

Source: Eurostat, UniCredit Research

A3 Decomposition of labor productivity growth into VA and employment growth

SK - CAGR 1995-2009				CZ - CAGR 1995-2009				PL - CAGR 1995-2009			
	Labour productivity	Value added	Employment		Labour productivity	Value added	Employment		Labour productivity	Value added	Employment
TOTAL	4.0%	4.4%	0.3%	TOTAL	2.8%	2.9%	0.1%	TOTAL	4.6%	5.2%	0.5%
Agriculture	13.0%	5.2%	-6.9%	Agriculture	4.7%	0.6%	-4.0%	Agriculture	5.8%	1.4%	-4.2%
Mining	6.8%	-0.3%	-6.6%	Mining	-1.0%	-5.9%	-5.0%	Mining	1.3%	-2.6%	-3.8%
Manufacturing	8.2%	7.0%	-1.1%	Manufacturing	5.4%	5.2%	-0.2%	Manufacturing	7.5%	7.6%	0.0%
Utilities	-0.4%	-2.2%	-1.9%	Utilities	1.6%	-0.9%	-2.5%	Utilities	1.4%	0.6%	-0.8%
Construction	3.4%	5.3%	1.8%	Construction	-0.2%	-0.6%	-0.4%	Construction	0.6%	3.6%	3.0%
Trade	3.2%	7.7%	4.4%	Trade	7.3%	7.1%	-0.2%	Trade	2.6%	4.4%	1.7%
Hotels & Restaurants	-1.4%	0.1%	1.6%	Hotels & Restaurants	-7.6%	-6.2%	1.6%	Hotels & Restaurants	0.9%	4.8%	3.9%
Transport & Comm.	0.2%	-0.2%	-0.4%	Transport & Comm.	2.6%	2.8%	0.2%	Transport & Comm.	3.8%	5.1%	1.2%
Financial Intermediation	-6.1%	-4.2%	2.0%	Financial Intermediation	4.4%	5.5%	1.0%	Financial Intermediation	7.0%	9.8%	2.6%
RE&Business Activities	0.1%	4.4%	4.3%	RE&Business Activities	-2.0%	1.1%	3.1%	RE&Business Activities	-1.3%	3.4%	4.8%
Public Administration	6.5%	7.3%	0.7%	Public Administration	0.5%	0.9%	0.3%	Public Administration	-3.2%	3.8%	7.2%
Education	4.8%	3.4%	-1.3%	Education	1.6%	2.1%	0.5%	Education	-0.7%	1.8%	2.5%
Health & Social Work	0.7%	0.5%	-0.2%	Health & Social Work	-3.9%	-3.4%	0.5%	Health & Social Work	1.6%	0.9%	-0.7%
Other Services	7.1%	5.7%	-1.3%	Other Services	-1.7%	0.5%	2.3%	Other Services	-1.1%	2.5%	3.7%
Agriculture	13.0%	5.2%	-6.9%	Agriculture	4.7%	0.6%	-4.0%	Agriculture	5.8%	1.4%	-4.2%
Manufacturing	8.2%	7.0%	-1.1%	Manufacturing	5.4%	5.2%	-0.2%	Manufacturing	7.5%	7.6%	0.0%
Other Industries	1.9%	2.6%	0.7%	Other Industries	-0.1%	-1.2%	-1.1%	Other Industries	0.7%	1.8%	1.1%
Market Services	0.4%	3.4%	3.0%	Market Services	2.2%	3.2%	1.0%	Market Services	2.2%	4.6%	2.4%
Non-market Services	5.2%	4.7%	-0.5%	Non-market Services	-0.7%	0.1%	0.8%	Non-market Services	-0.1%	2.4%	2.6%

HU - CAGR 1995-2009				SI - CAGR 1995-2009				RO - CAGR 1996-2008			
	Labour productivity	Value added	Employment		Labour productivity	Value added	Employment		Labour productivity	Value added	Employment
TOTAL	2.6%	2.5%	0.0%	TOTAL	2.9%	3.4%	0.5%	TOTAL	3.4%	3.4%	0.0%
Agriculture	8.7%	3.1%	-5.2%	Agriculture	3.1%	-0.1%	-3.1%	Agriculture	1.1%	-0.3%	-1.4%
Mining	9.1%	-1.1%	-9.4%	Mining	8.5%	0.9%	-7.1%	Mining	4.3%	-3.0%	-7.0%
Manufacturing	4.8%	4.5%	-0.3%	Manufacturing	5.5%	3.4%	-2.0%	Manufacturing	4.9%	3.2%	-1.6%
Utilities	-0.2%	-3.2%	-3.1%	Utilities	2.7%	2.1%	-0.6%	Utilities	-0.3%	-1.9%	-1.5%
Construction	-0.7%	1.7%	2.5%	Construction	1.0%	4.1%	3.1%	Construction	4.5%	8.3%	3.7%
Trade	1.6%	3.0%	1.4%	Trade	2.7%	3.2%	0.5%	Trade	4.6%	8.3%	3.5%
Hotels & Restaurants	-1.9%	-0.1%	1.9%	Hotels & Restaurants	0.3%	2.0%	1.7%	Hotels & Restaurants	-0.1%	1.3%	1.4%
Transport & Comm.	4.1%	3.1%	-0.9%	Transport & Comm.	2.5%	3.6%	1.1%	Transport & Comm.	4.4%	3.6%	-0.8%
Financial Intermediation	-4.4%	-3.6%	0.9%	Financial Intermediation	5.8%	8.5%	2.5%	Financial Intermediation	1.8%	4.5%	2.7%
RE&Business Activities	-2.1%	3.6%	5.8%	RE&Business Activities	-1.8%	3.2%	5.1%	RE&Business Activities	2.1%	4.6%	2.5%
Public Administration	1.4%	1.7%	0.2%	Public Administration	1.2%	4.1%	2.9%	Public Administration	-10.6%	-1.5%	10.1%
Education	1.7%	1.6%	-0.1%	Education	1.2%	3.0%	1.8%	Education	3.9%	2.8%	-1.0%
Health & Social Work	1.3%	1.9%	0.5%	Health & Social Work	1.1%	2.7%	1.6%	Health & Social Work	-0.6%	0.5%	1.2%
Other Services	0.3%	0.0%	-0.1%	Other Services	-0.7%	1.9%	2.6%	Other Services	2.3%	5.7%	3.3%
Agriculture	8.7%	3.1%	-5.2%	Agriculture	3.1%	-0.1%	-3.1%	Agriculture	1.1%	-0.3%	-1.4%
Manufacturing	4.8%	4.5%	-0.3%	Manufacturing	5.5%	3.4%	-2.0%	Manufacturing	4.9%	3.2%	-1.6%
Other Industries	-0.8%	-0.3%	0.5%	Other Industries	1.4%	3.3%	1.9%	Other Industries	3.5%	4.2%	0.7%
Market Services	0.7%	2.3%	1.6%	Market Services	1.8%	3.9%	2.1%	Market Services	3.1%	5.2%	2.0%
Non-market Services	1.2%	1.3%	0.1%	Non-market Services	0.9%	3.0%	2.1%	Non-market Services	-0.6%	1.8%	2.4%

LV - CAGR 1995-2009				LT - CAGR 1995-2009				EE - CAGR 1995-2009			
	Labour productivity	Value added	Employment		Labour productivity	Value added	Employment		Labour productivity	Value added	Employment
TOTAL	4.8%	4.8%	0.1%	TOTAL	5.0%	4.6%	-0.3%	TOTAL	5.3%	4.9%	-0.4%
Agriculture	7.1%	1.9%	-4.9%	Agriculture	7.5%	1.7%	-5.4%	Agriculture	10.5%	2.9%	-6.8%
Mining	15.5%	16.0%	0.4%	Mining	5.4%	3.7%	-1.6%	Mining	5.0%	2.4%	-2.5%
Manufacturing	5.7%	2.8%	-2.7%	Manufacturing	7.6%	5.9%	-1.6%	Manufacturing	7.2%	5.2%	-1.9%
Utilities	2.5%	0.6%	-1.9%	Utilities	6.8%	2.7%	-3.9%	Utilities	2.8%	-1.1%	-3.8%
Construction	3.1%	6.7%	3.5%	Construction	0.3%	2.4%	2.0%	Construction	2.3%	5.1%	2.8%
Trade	4.2%	7.2%	2.9%	Trade	4.0%	5.4%	1.3%	Trade	4.8%	5.5%	0.7%
Hotels & Restaurants	1.4%	4.7%	3.2%	Hotels & Restaurants	-1.9%	2.4%	4.4%	Hotels & Restaurants	3.6%	5.1%	1.5%
Transport & Comm.	4.3%	4.7%	0.4%	Transport & Comm.	5.1%	5.4%	0.3%	Transport & Comm.	6.4%	4.7%	-1.6%
Financial Intermediation	0.5%	3.6%	3.1%	Financial Intermediation	3.1%	3.6%	0.5%	Financial Intermediation	11.3%	15.9%	4.2%
RE&Business Activities	2.0%	9.3%	7.2%	RE&Business Activities	1.3%	6.6%	5.3%	RE&Business Activities	0.9%	4.9%	4.0%
Public Administration	1.6%	2.5%	0.9%	Public Administration	3.5%	4.3%	0.8%	Public Administration	3.1%	3.8%	0.6%
Education	2.4%	1.6%	-0.8%	Education	2.2%	2.4%	0.2%	Education	-0.5%	0.8%	1.4%
Health & Social Work	2.1%	0.9%	-1.2%	Health & Social Work	3.5%	2.9%	-0.6%	Health & Social Work	1.2%	1.1%	-0.1%
Other Services	5.8%	6.0%	0.1%	Other Services	1.1%	3.5%	2.4%	Other Services	2.4%	2.4%	0.0%
Agriculture	7.1%	1.9%	-4.9%	Agriculture	7.5%	1.7%	-5.4%	Agriculture	10.5%	2.9%	-6.8%
Manufacturing	5.7%	2.8%	-2.7%	Manufacturing	7.6%	5.9%	-1.6%	Manufacturing	7.2%	5.2%	-1.9%
Other Industries	2.1%	4.5%	2.3%	Other Industries	1.9%	2.5%	0.6%	Other Industries	1.7%	2.5%	0.8%
Market Services	3.5%	6.6%	3.0%	Market Services	3.6%	5.5%	1.8%	Market Services	4.9%	5.8%	0.9%
Non-market Services	2.9%	2.6%	-0.3%	Non-market Services	3.0%	3.5%	0.4%	Non-market Services	1.6%	2.2%	0.6%

Source: Eurostat, UniCredit Research

A4 Sector productivity as % of EU (15) productivity, 2009

Agriculture		Manufacturing		Other Industries		Market Services		Non-market Services	
EU9	36,4%	EU9	55,7%	EU9	59,1%	EU9	66,0%	EU9	64,8%
SK	213,1%	SK	64,8%	SK	94,2%	SI	76,3%	SI	94,5%
CZ	98,0%	SI	64,7%	CZ	71,5%	PL	69,6%	SK	72,3%
EE	82,3%	HU	62,2%	SI	66,8%	SK	68,9%	CZ	72,3%
HU	66,8%	CZ	60,5%	PL	60,1%	HU	67,0%	HU	69,0%
SI	47,5%	PL	55,2%	RO*	54,8%	RO*	63,7%	PL	64,2%
LT	43,6%	LT	52,1%	EE	52,2%	CZ	63,5%	RO*	57,8%
LV	41,9%	RO*	45,2%	LV	46,0%	EE	63,5%	LV	55,4%
PL	36,7%	EE	39,6%	HU	45,9%	LT	60,7%	EE	52,9%
RO*	23,6%	LV	35,1%	LT	43,9%	LV	52,6%	LT	52,5%

Source: Eurostat, UniCredit Research

Note: Data on Romania as of 2008