The Correlation between Employment and Productivity of Older Workers

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Abstract. *Romania's economy has been affected by the economic crisis and this is reflected not only in financial results, but also demographic. The population of Romania decreased in the last decade by more than 2.6 million people, reaching the lowest level in 35 years. Therefore, given the decrease of the active population available, reduces employment of the workforce and increase unemployment, this phenomenon propagating with extraordinary rapidity on the economy and living standards of the population and especially among older workers, so most of the population aging rate recorded declining activity. Labor productivity per hour or per employee, older workers has increased due to the quality of work, experience and degree of motivation professional regarding job retention. Labor productivity can be maintained as a higher level, will lead in time to a slight increase in occupancy jumps labor - default generally vulnerable age group of 55-64 years, which is the subject of this analysis.*

Keywords: active aging, labor productivity, employment.

JEL Classification: J4, J6.

1. Evolution of total labour productivity

Labour productivity is labour-effectiveness of a country at a time. Labour productivity can be calculated per worker or per hour worked. If we analyse the data provided by Eurostat (see Table 1). We find that productivity in Romania is 17.4% of the EU 28 and 15% from the average of the Euro zone, thus placing second last, last being Bulgaria with an average productivity per hour worked of 4.5%. Romania recorded an average hourly productivity, in the year 2013, identical to that of 2008, at 5.6 euro/hour worked, and the lowest productivity per hour was recorded in 2010 at 5.3 euro/hour.

Table 1. *The evolution of productivity per hour worked in the UE28 (euro/hour worked)*

	2008	2009	2010	2011	2012	2013	2013/2008
UE 28	31,2	30,7	31,4	31,8	31,9	32,1	+0,9
UE 18	35,9	53,5	36,3	36,7	37,0	37,3	+1,4
Belgium	46,0	45,3	45,9	45,8	45,7	45,9	-0,1
Bulgaria	4,3	4,3	4,5	4,7	4,8	4,9	+0,1
Czech	13,0	12,8	13,0	13,3	13,2	13,1	+0,1
Denmark	51,1	49,8	52,4	52,5	52,6	53,4	+2,3
Germany	42,0	40,9	41,7	42,4	42,6	42,8	+0,8
Estonia	10,0	10,3	10,8	10,8	11,2	11,2	+1,2
Ireland	45,0	46,5	48,2	50,1	51,4	48,8	+3,8
Greece	22,2	21,1	20,4	19,9	20,2	20,2	-2,0
Spain	28,7	29,4	30,0	30,4	31,5	32,1	+3,4
France	44,4	44,2	44,7	45,3	45,4	45,6	+1,2
Croatia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Italy	32,4	31,7	32,5	32,5	32,2	32,2	-0,2
Cyprus	21,2	21,0	21,3	21,2	21,5	21,6	+0,4
Latvia	7,3	7,2	7,6	7,9	8,2	8,4	+1,1
Lithuania	8,8	8,3	9,4	10,1	10,3	10,6	+1,8
Luxembourg	60,8	59,4	60,0	59,5	58,2	n.a.	n.a.
Hungary	11,3	10,9	11,0	11,0	11,3	11,5	+0,2
Malta	15,4	14,6	15,2	14,2	14,5	n.a.	n.a.
Netherlands	46,2	45,1	46,0	46,1	45,6	45,8	-0,4
Austria	38,3	38,2	38,9	39,1	39,5	39,9	+1,6
Poland	9,0	9,1	9,8	10,2	10,4	n.a.	n.a.
Portugal	16,1	16,1	16,7	16,9	17,0	17,1	+1,0
Romania	**5,6**	**5,4**	**5,3**	**5,4**	**5,4**	**5,6**	**0**
Slovenia	20,1	21,1	20,6	21,4	21,3	21,4	+1,3
Slovakia	12,1	11,8	12,3	12,6	12,8	13,2	+1,1
Finland	40,3	38,2	39,4	40,0	39,5	39,7	-0,6
Sweden	43,3	42,3	44,0	44,4	44,9	45,5	+2,2
UK	40,3	39,3	39,8	40,0	39,3	39,2	-0,9

Source: Eurostat, data available online at http: www.cursdeguvernare.ro/

An interesting analysis is to assess the total factor production, meaning contribution of each factor of production to total productivity developments. In this regard we present contribution of capital factor and of labour factor in total productivity.

Table 2. *Evolution of total labour productivity*

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total productivity of factors of production	100	104.8	106.4	108.8	101	98.3	99.4	97.4	99.9	100.9	101.8
Labour 's portion in the total productivity of factors of production	100	104.2	107.9	112.5	109.3	108.8	110.8	110.3	112.8	114.2	115.5
The incumbent capital in total productivity of factors of production	100	100.6	98.9	97	92.6	90.6	90	88.6	88.9	88.7	88.5

Source: Eurostat data, 2005-2015.

Figure 1. *Evolution of total factor production*

Source: Eurostat data, http://appsso.eurostat.ec.europa.eu
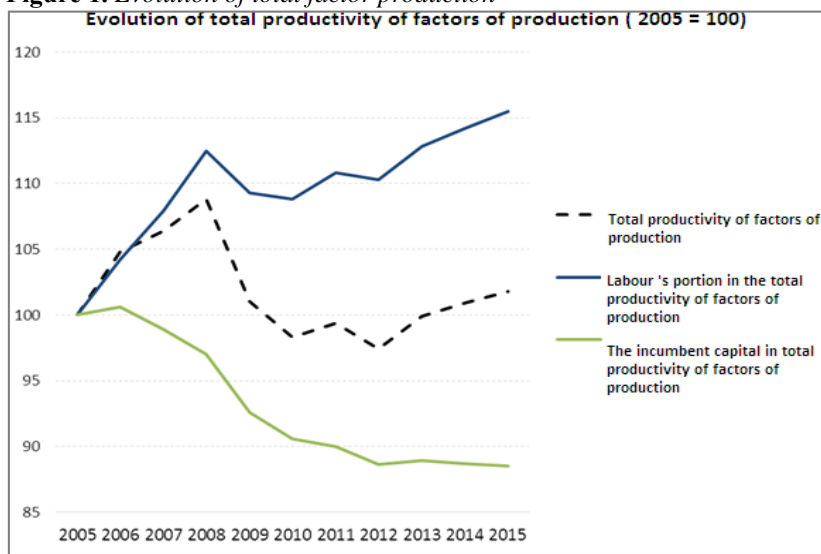
Analysing the chart above, we can draw the following conclusions: capital's share in increasing the total productivity of the production factors has fallen drastically in the 2005-2015 period, by circa 11-12 percent. In Romania, in the 2000-2007period, investments were made into capital, which has led to an increase in the degree of automation, computerization and synthesizing of economic processes and phenomena, causing important changes in the economy. With the onset of economic crisis, the part of total production factor productivity which is due to capital has recorded a decrease, which means that if in the period previous to the crisis, investment had been made into capital, after the year 2007, economic agents have reduced investment in capital, there being a period during which investment in economic process structure was recovered.

This phenomenon may have multiple explanations: the occupied population, belonging to various domains and branches of the economy, have efficiently exploited the capital which had been acquired previously; hourly labour or employee productivity have risen either thanks to work quality, to better prepared employees, to the increase of employee's motivation in terms of keeping their job. Better said, due to a sense of fear around the possibility of losing their job, employees being motivated to get involved in increasing

productivity and accepting to work overtime. We believe that a fairly large percentage that leads to the growth of labour productivity per hour or per employee was the extension of working hours over schedule in individual labour contract without being paid overtime. This statement is based on the fact that the employment rate both nationally and in the 55-64 age group remained relatively constant during the period analysed, so if labour productivity grows without hiring more people means increased number hours of work which has resulted in increased work intensity.

Certainly interpreting these contradictory developments of the two essential factors lead to an idea already extensively circulated in the economic world, that today and especially in the near future, the decisive factor to make the difference between economic operators will be the quality of workforce they have available. Specifically human resources talent, both in managerial and technology industries will be decisive in the fierce competition between economic operators at a national, European and even global level. This economic phenomenon occurred naturally, because while the technical means to produce technologically advanced technical machinery are available for all major operators whom are in competition, the difference will be made by their management and marketing intelligence in direct correlation to the user talent available, their technical resources and the technical capacity of human resources. As for example in Formula 1 racing cars, race cars where technological quality is relatively equal, the difference being made of the quality / experience of pilots and technical personnel organizing team.

2. Labour productivity and employment in Romania

Work productivity per hour worked has recorded an increase of over 20% in the 2005-2008 period, as compared to the occupation rate increasing by 1.4%, then work productivity has gone down to the year 2012 by about 5 percent, and on the other hand the occupation rate has risen by 1.2%, and in the year 2013, work productivity has gone back to the value recorded in 2008, as opposed to the occupation rate of 2010.

According to the graph in Figure 3, the occupation of the labour force aged 15-64 years in the 2005-2014 period varies relatively little. Such a rate, of almost 58% in 2005, going up to about 61% in 2015. Basically, an increase of only 3 percent absolute interval of 10 years of evolution or approx. 4 percent relative to 2014 by reporting 2005. It must be said, however, that this increase, even slightly higher, is maintained in the 55-64 years age group. Interestingly, however, that theses mall percentage increases of occupancy occur under conditions of significant increases in labour productivity, with circa20-22 percent by comparing 2014 relative to 2005.

Analysing the histogram in Figure 4, we notice an almost perfect dependence between labour productivity per employee and labour productivity per hour, respectively. Throughout the period analysed, these two dimensions are almost equal, labour productivity per person employed always being slightly superior to productivity per hour worked, which again emphasizes that the number of employees has not increased, but the number of hours of work has increased, which has led to an increase in labour intensity.

Table 3. *The employment rate in Romania*

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
From 15 to 64 years;	57.6	58.8	58.8	59.0	58.6	60.2	59.3	60.2	60.1	61.0
From 55 to 64 years;	39.4	41.7	41.4	43.1	42.6	40.7	39.9	41.6	41.8	43.1

Source: Eurostat data, http://appsso.eurostat.ec.europa.eu

Table 4. *Labour productivity per hour worked in Romania (2005 = 100)*

2005	2006	2007	2008	2009	2010	2011	2012	2013
100	106.2	112	120.2	115.2	114.6	116.2	115.8	120.5

Source: Eurostat data, http://appsso.eurostat.ec.europa.eu

Table 5. *Labour productivity per person employed in Romania (2005 = 100)*

2005	2006	2007	2008	2009	2010	2011	2012	2013
100	107.1	113.5	121.8	116.1	115.1	118.7	117.8	122.1

Source: Eurostat data, http://appsso.eurostat.ec.europa.eu

Table 6. *Labour productivity and employment in Romania (2005 = 100)*

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Labour productivity per hour worked	100	106.2	112	120.2	115.2	114.6	116.2	115.8	120.5
Employment rate, 15-64 years	100	102.1	102.1	102.4	101.7	104.5	103.0	104.5	104.3

Source: Eurostat data, http://appsso.eurostat.ec.europa.eu

Figure 2. *Labour productivity and employment in Romania*
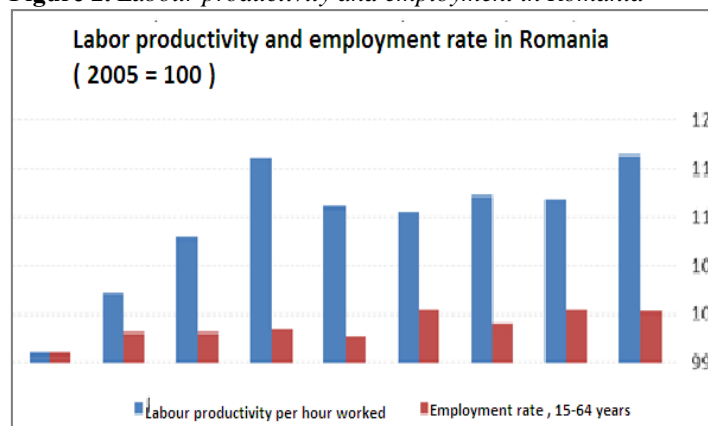
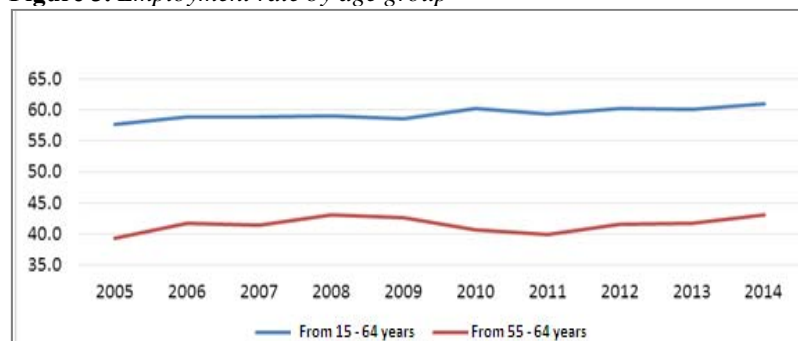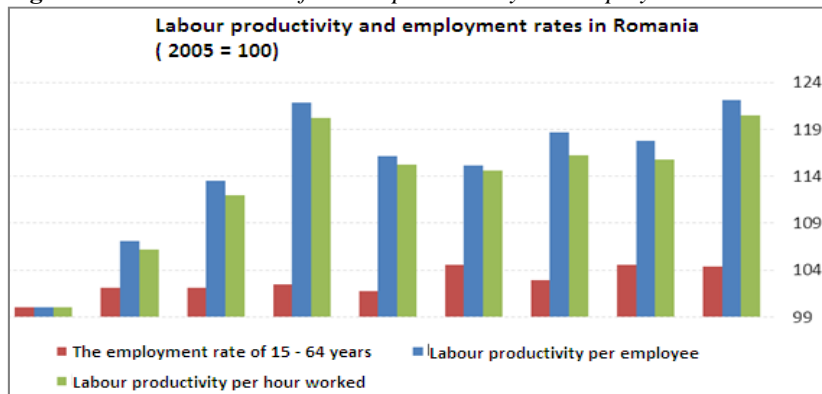

Figure 3. *Employment rate by age group*

Figure 4. *The correlation of labour productivity and employment rates*

The analysis correlation from labour productivity and employment in Romania, we cannot conclude the existence of an obvious between labour productivity per person employed or per hour worked respectively and employment of labour. Although we see an increase in occupancy for a long time, as labour productivity increases, this correlation is not strict. There are periods during which relatively spectacular increases take place, followed by workforce occupation holding at a fairly constant level. At times, as work productivity increases ever so slightly, or even goes down a bit, workforce occupation percentages still go up rather spectacularly. It is noteworthy that the overall more or less evident increase in work productivity engages the workforce occupation rate on a sinusoidal pattern.

As a general conclusion, we can say that labour productivity could not be maintained at a higher level, which will in time lead to a slight increase in labour occupancy jumps. This is due on one hand to labour productivity increases automatically bringing the same level of production regression occupancy, and on the other hand leading to GDP growth, which gives resources for new investments or extensions to existing investments, with the effect of increasing long-term employment.

3. Labour productivity and capital endowment of employed population

The graph shown in Figure 5 highlights the importance of the "capital" factor in our country in the 2005-2013period. Starting from a level of 100% relative to 2005, we see a relative increase of approx. 20 percent labour productivity per hour worked, without taking into account the capital endowment growth of the national economy. If we consider this element essential, we find a relative increase in total labour productivity at the end of the period, of approx. 80 percent. Consequently, as indeed it was intuitive for a country like Romania, with a modest capital, capital's factor of influence in these conditions is absolutely crucial. So investment in new, modern production capacity and / or retrofitting existing ones is key to increasing labour productivity. The discrepancy compared to economically stronger developed countries, where capital endowment is at its peak, the peak area labour productivity growth is much more affected by the quality of the human factor.

Table 7. *Occupied population capital endowment*

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Labour productivity per hour worked	100	106.2	112	120.2	115.2	114.6	116.2	115.8	120.5
Occupied population capital endowment	100	105.4	119.6	138.0	147.3	154.1	161.6	176.7	182.0

Figure 5. *Labour productivity and capital endowment*
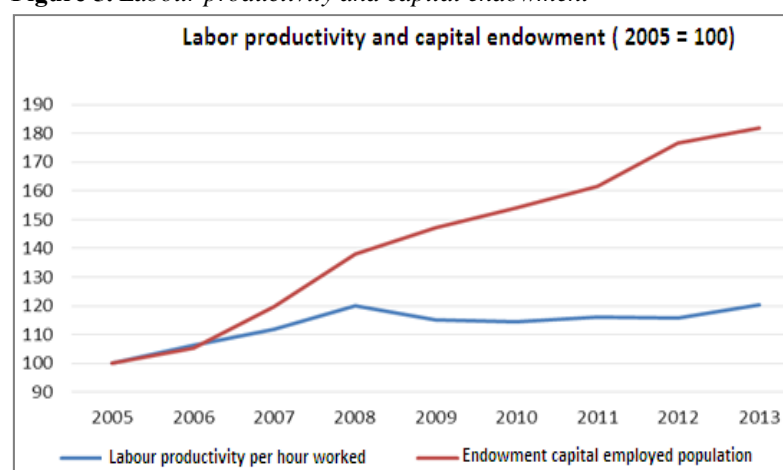
Source: AMECO online, net capital stock per person employed at 2010 prices: total economy - Capital intensity (RKNDE)

4. The relationship between industrial growth and labour productivity

The graph shown in Figure 6, has a seemingly improbable configuration. With the advent and development of global financial and economic crisis in our country, in 2008, the industrial production drops sharply, as a result of lower demand for products and services in this area. The immediate reaction of economic agents is to massively dismiss workforce belonging to this sector. Expecting a downwards, regressive evolution of demand for products and services in the immediately following period, an idea born and grown within he economic-financial world by the so-called crisis "psychosis", employers making excessive layoffs compared to what workforce they have, many times going as far as to stop all activity, be it temporarily or permanently. So as to satisfy the reduced demand for goods, products and services, using a relatively undersized workforce, it becomes absolutely necessary to increase work productivity by all means. This fact explains the completely discrepant evolution between the decrease in industrial production and the increase in work productivity.

Table 8. *The correlation between industrial production and labour productivity*

	2008	2009	2010	2011	2012	2013	Total
Industrial production (growth in%)	2.7	-5.5	-5.5	7.5	2.4	7.9	21.6
Labour productivity	6.8	12.5	17.1	6.1	-0.1	7.1	59.7

Source: Eurostat data, http://appsso.eurostat.ec.europa.eu

Figure 6. *The correlation between industrial production and labour productivity*
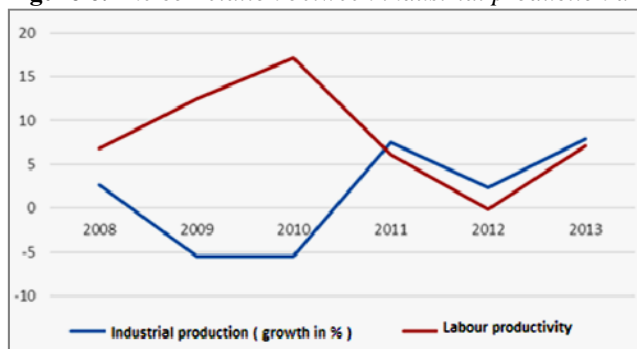
This tendency remains unchanged for the 2008-2009 period, the height of the crisis in Romania, period in which production constantly went down. Although, beginning from the year 2009, the decrease in industrial production has no longer followed the same disastrous trend, entering a period of recession, work productivity continuing to rise, precisely so as to make it possible to raise industrial production back to acceptable values, which actually has been going on starting from 2010. From that moment on, a series of temporarily blocked industrial capacities are restarted and people are hired back, on the upwards trend of increasing industrial production. The workforce hired, this time greater in relation to the actual demand for goods and industrial services, inherently leads to a decrease in work productivity, to a point of balance between demand and offer. This took place in 2011. From there on, work productivity and industrial production enter normality, as suggested by the constant, practically parallel trends between the two economic indicators analysed, in which case a decrease in industrial production causes a decrease in work productivity (the 2011-2012 period) and respectively, an increase in industrial production is tied to an increase in work productivity (the 2012-2013 period).

Conclusions

Between labor productivity and the employment rate there is no strict correlation, but labor productivity is maintained as pate at a higher level, that also leads to a slight increase in occupancy. If the employment rate both nationally and in the age group 55-64 years has remained relatively constant in the period, and increased labor productivity means that either increased the number of hours of work or because of the quality of work (professionally trained employees better). Given that the technical means of production become available for all operators, the difference will be made by intelligence and talent management Workforce share resources and means of production.

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