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Article

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The Analysis of the Number of Employees, Net Nominal Earnings and Labour Productivity in Romania

Catalin Angelo Ioan[1], Gina Ioan [2]

Abstract: The article deals with the link between the number of employees, net nominal earnings and labor productivity in Romania. Conclusions of the analysis consists in adapting prudent wage policy in relation to productivity gains and economic structure by ownership.

Keywords: employee; net nominal earning; labour productivity

JEL Classification: D43

1. Introduction

In a country subject to continuous changes and economic strategies modifying, analysis of the number of employees by ownership, the net nominal earnings and labor productivity is a mandatory step towards understanding the justice of macroeconomic and social policies. We will analyze the situation respect to these indicators during 2000-2015 for Romania.

Table 1. The evolution of total employees by ownership during 2000-2015 for Romania

Year	Total employees	Total employees public property	Total employees private property	The ratio between total employees in public property and the total of employees	The ratio between total employees in private property and the total of employees
2000	4646287	2154454	2491833	46.37%	53.63%
2001	4613051	2007309	2605742	43.51%	56.49%
2002	4614720	1886048	2728672	40.87%	59.13%
2003	4655000	1710756	2944244	36.75%	63.25%
2004	4652704	1668301	2984403	35.86%	64.14%
2005	4790431	1551140	3239291	32.38%	67.62%
2006	4910088	1498664	3411424	30.52%	69.48%
2007	5162967	1519369	3643598	29.43%	70.57%
2008	5232694	1502291	3730403	28.71%	71.29%
2009	4879480	1494886	3384594	30.64%	69.36%
2010	4580989	1378437	3202552	30.09%	69.91%
2011	4660461	1320220	3340241	28.33%	71.67%
2012	4777152	1304743	3472409	27.31%	72.69%
2013	4801104	1278446	3522658	26.63%	73.37%
2014	4900684	1270336	3630348	25.92%	74.08%
2015	5041186	1257284	3783902	24.94%	75.06%

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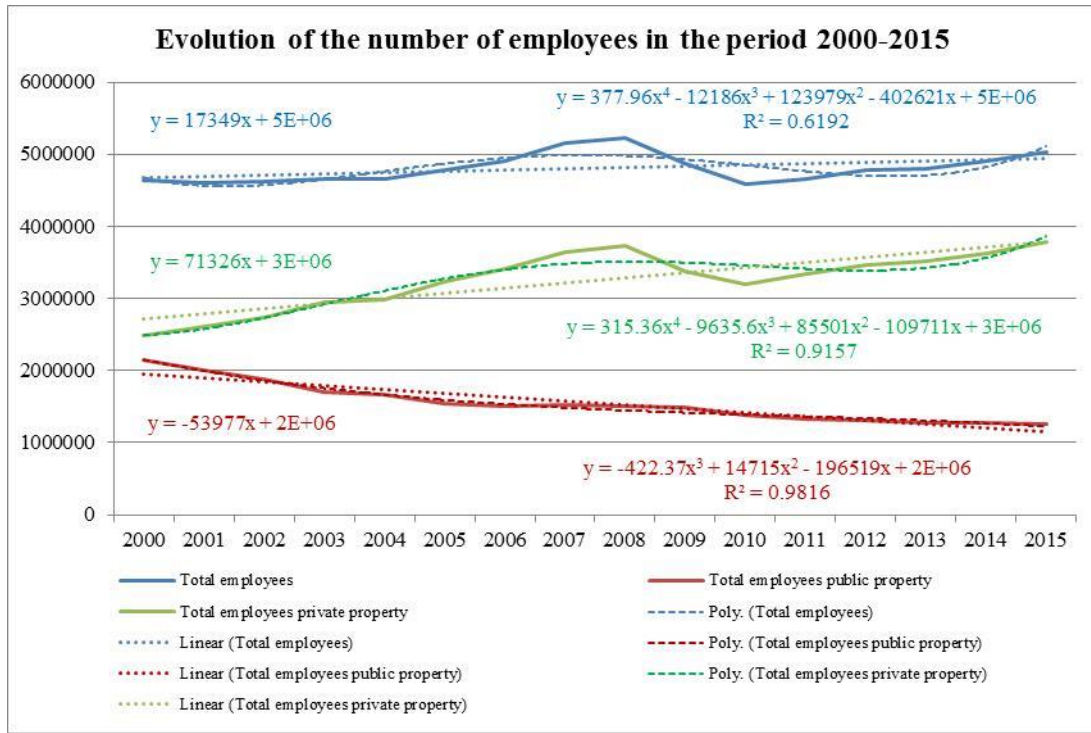
Source: INSSE and own analysis

Figure 1

In a temporal analysis a fact, rather pleasing, is the increasing of the number of employees in economy with a positive trend (17349/year) and a variation law: $y = 377.96x^4 - 12186x^3 + 123979x^2 - 402621x + 5 \cdot 10^6$ the regression analysis being edifying with a percentage of 61.92%. On the other hand, the dinamics of the number of employees in the private sector increases (71326/year), in a regression analysis (significant with a percentage of 91.57%) being given by the equation: $y = 315.36x^4 - 9635.6x^3 + 85501x^2 - 109711x + 3 \cdot 10^6$ which is to be welcomed for putting the economy on healthy capitalist basis. Also, the trend of the number of employees in the public sector is negative (-53977/year), in a regression analysis (significant with a percentage of 98.16%) being given by the equation: $y = -422.37x^3 + 14715x^2 - 196519x + 2 \cdot 10^6$.
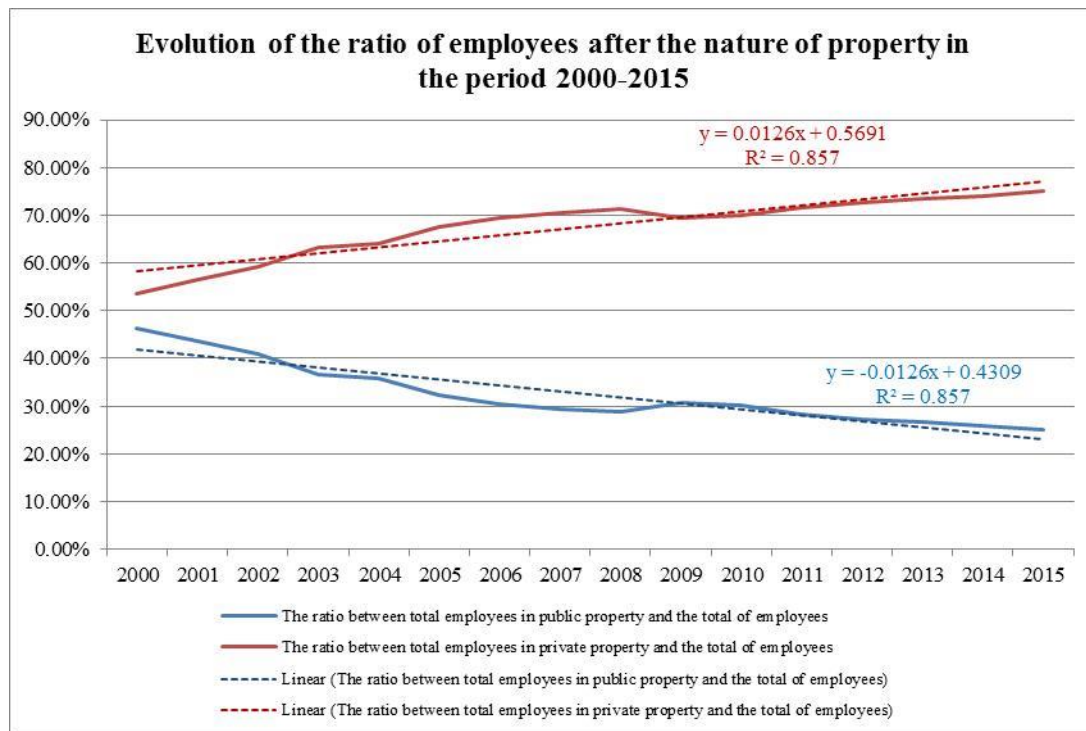
Figure 2.

Analysis of the ratio between total employees in public property and the total of employees reveals an almost continuous decline (except for the period 2009-2010, times of crisis!) approximately 1.26% per year, while the private sector is growing, obviously with the same percentage.

Table 2. The evolution of rate increase of employees by ownership during 2000-2015 for Romania

Year	Growth rate - Total employees	Growth rate - Total employees public property	Growth rate - Total employees private property
2001	-0.72%	-6.83%	4.57%
2002	0.04%	-6.04%	4.72%
2003	0.87%	-9.29%	7.90%
2004	-0.05%	-2.48%	1.36%
2005	2.96%	-7.02%	8.54%
2006	2.50%	-3.38%	5.31%
2007	5.15%	1.38%	6.81%
2008	1.35%	-1.12%	2.38%
2009	-6.75%	-0.49%	-9.27%
2010	-6.12%	-7.79%	-5.38%
2011	1.73%	-4.22%	4.30%
2012	2.50%	-1.17%	3.96%
2013	0.50%	-2.02%	1.45%
2014	2.07%	-0.63%	3.06%
2015	2.87%	-1.03%	4.23%

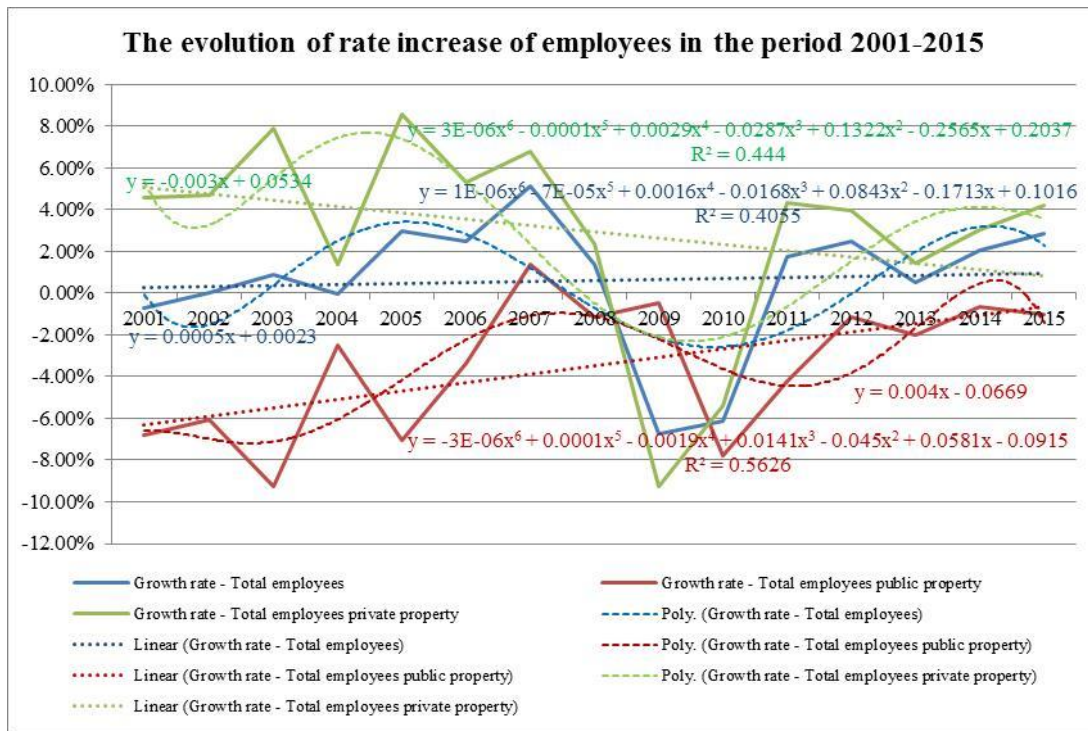*Source: INSSE and own analysis*

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Figure 3.

The analysis of the rate of increase in the number of employees shows a weak tendency increasing 0.05% / year, with a law of variation: $y = 1E\text{-}06x^6 - 7E\text{-}05x^5 + 0.0016x^4 - 0.0168x^3 + 0.0843x^2 - 0.1713x + 0.1016$, the regression analysis being edifying with a percentage of 40.55%.

The analysis of the rate of increase in the number of employees for private property shows a downward trend (-0.3% / year), with a law of variation: $y = 3E\text{-}06x^6 - 0.0001x^5 + 0.0029x^4 - 0.0287x^3 + 0.1322x^2 - 0.2565x + 0.2037$, the regression analysis being edifying with a percentage of 44.4%.

The analysis of the rate of increase in the number of employees for public property shows an increasing tendency 0.4% / year, with a law of variation: $y = -3E\text{-}06x^6 + 0.0001x^5 - 0.0019x^4 + 0.0141x^3 - 0.045x^2 + 0.0581x - 0.0915$, the regression analysis being edifying with a percentage of 56.26%.

The analysis reflects a very worrying fact given that the Romanian economy is underdeveloped compared with the rest of the European Union. Public sector development detrimental the private sector attract major macroeconomic imbalances and deficits approaching levels downright dangerous.

Table 3. The evolution of rate increase variation of employees by ownership during 2000-2015 for Romania

Year	Variation in growth rate - Total employees	Variation in growth rate - Total employees public property	Variation in growth rate - Total employees private property
2002	0.75%	0.79%	0.15%
2003	0.84%	-3.25%	3.18%
2004	-0.92%	6.81%	-6.54%
2005	3.01%	-4.54%	7.18%
2006	-0.46%	3.64%	-3.23%
2007	2.65%	4.76%	1.49%
2008	-3.80%	-2.51%	-4.42%

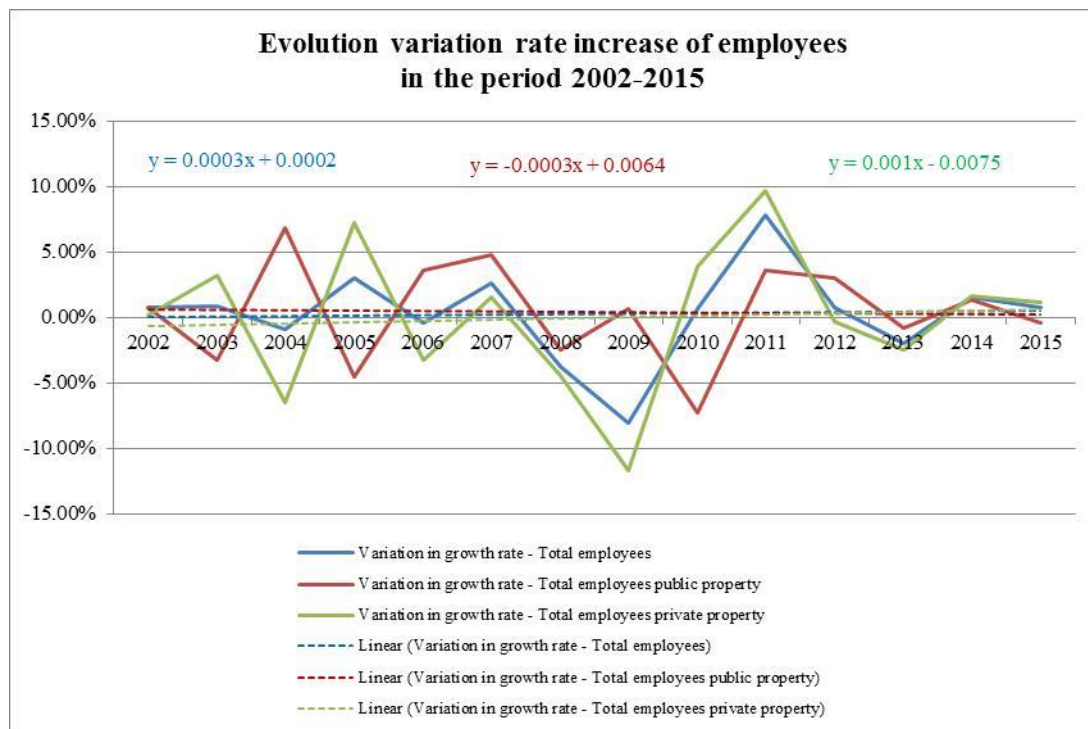|			
2009	-8.10%	0.63%	-11.65%
2010	0.63%	-7.30%	3.89%
2011	7.85%	3.57%	9.68%
2012	0.77%	3.05%	-0.34%
2013	-2.00%	-0.84%	-2.51%
2014	1.57%	1.38%	1.61%
2015	0.79%	-0.39%	1.17%

Source: INSSE and own analysis

Figure 4

The analysis of the rate of increase variation (difference between the new rate and the old rate) in the number of employees shows an increasing tendency 0.03/year.

The analysis of the rate of increase variation in the number of employees for private property shows a weak positive trend (0.1% / year) and for public property shows a decreasing tendency -0.03%/year.

Since the change rate of evolution of the three indicators is relatively low in recent years follows that the growing trend of public sector employees and lowering the private sector will continue.

Table 4. The evolution of Net nominal monthly average earnings by ownership during 2000-2015 for Romania (lei 2000)

Year	Net nominal monthly average earnings-Total (lei 2000)	Net nominal monthly average earnings-Total public property (lei 2000)	Net nominal monthly average earnings-Total private property (lei 2000)
2000	214	245	170
2001	219.86	250.43	173.26
2002	223.61	257.24	172.87
2003	230.38	271.32	186.59
2004	247.99	293.53	199.96

2005	275.27	331.36	220.29
2006	289.24	371.41	223.78
2007	306.35	391.61	243.14
2008	333.8	432.48	262.65
2009	333.45	420.42	265.34
2010	322.71	369.58	265.87
2011	320.57	350.32	273.5
2012	319.48	354.46	268.18
2013	323.7	372.08	266.09
2014	341.1	396.98	279.99
2015	362.51	411.65	299.52

Source: INSSE and own analysis

Meanwhile, the development of Net nominal average monthly earnings has undergone different rhythms. Thereafter (Figure 5), with the increase in the number of employees in the economy, the average wage also increased.
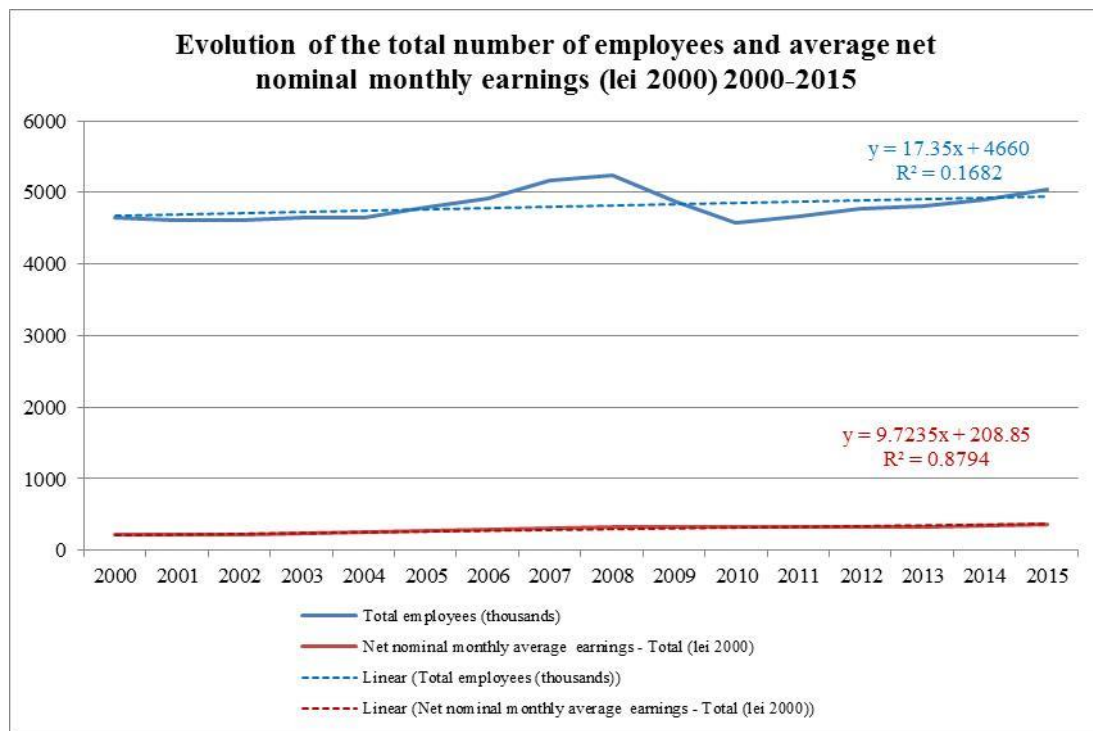

Figure 5

On the other hand, while the growth rate of the employees in the economy recording an upward trend (0.05%/year) the average monthly salary undergoes a significant decrease of -0.2% per year during obvious populist variations in election years (figure 6).
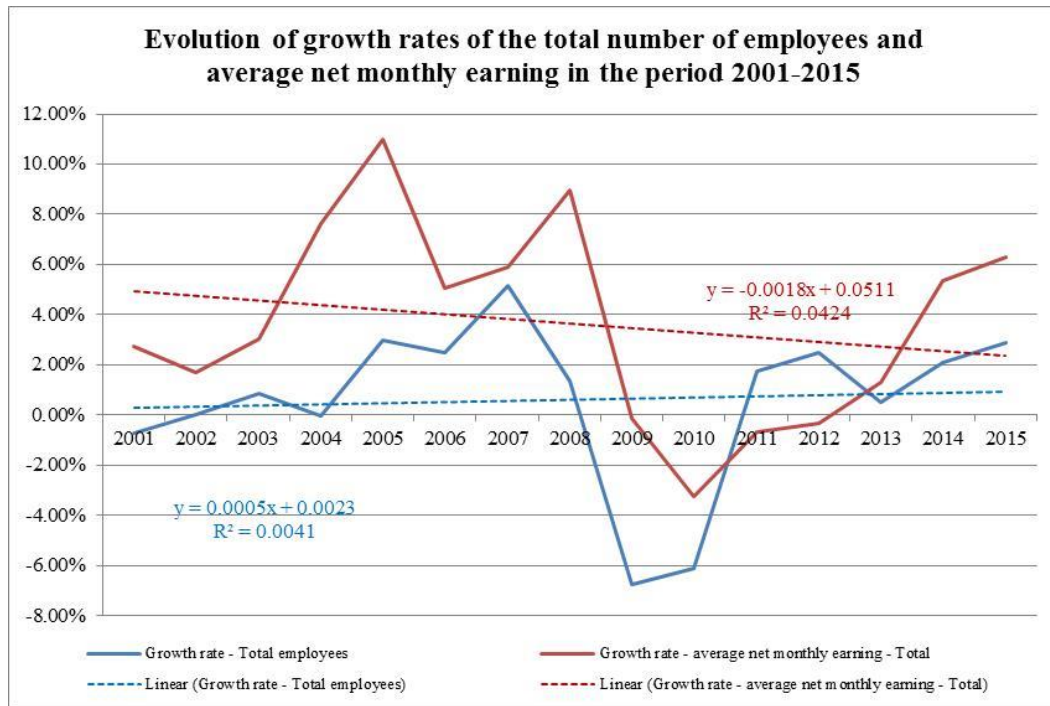
Figure 6

Analysis of variations on the two forms of property looks entirely different state of affairs. Thereafter (Figure 7) at an increase of the number of employees in the private sector, there is a relative increase of wages. An encouraging fact is that, despite the growth of private sector employees is decreasing (0.3% / year), the wage decreases by only 0.16%/year (Figure 8).
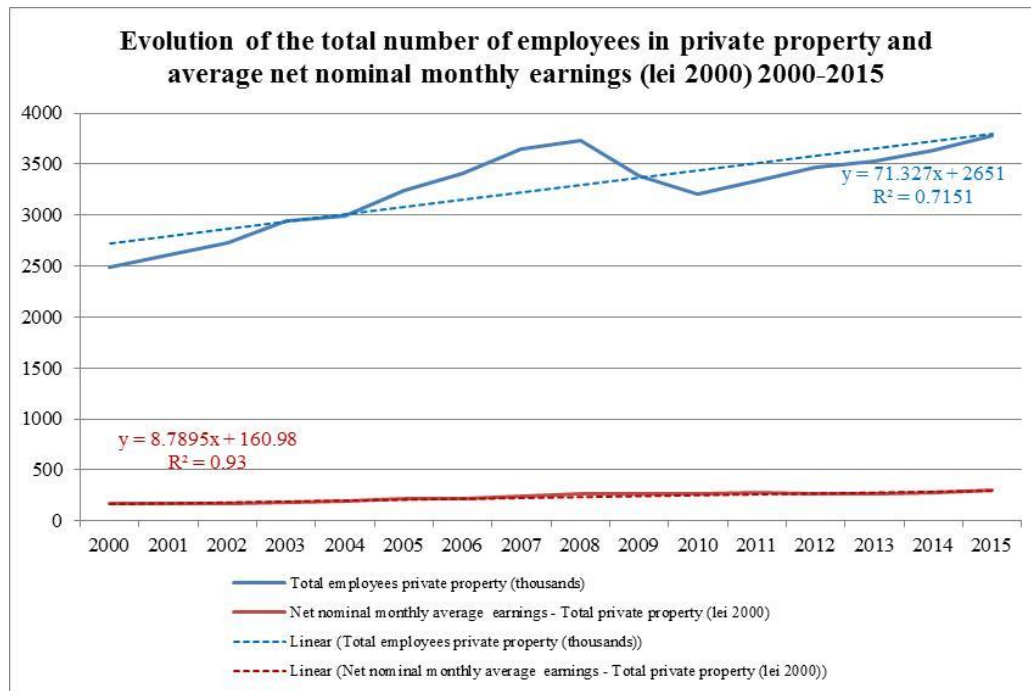
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Figure 7
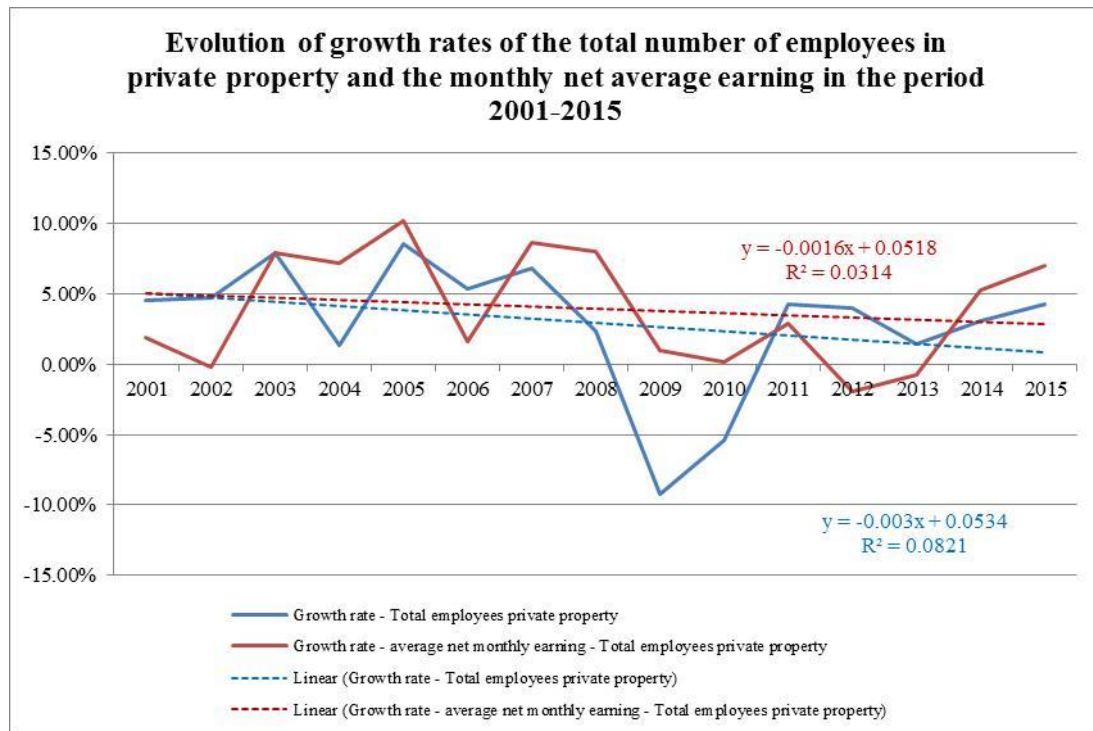
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Figure 8

On the other hand, in the public sector, the number of employees decreases and the average salary is developing upward (Figure 9). On the other hand, the rate of decrease in number of employees tends to 0, and the wages too. Therefore, the outlook could be happy at reaching equilibrium situation in the public sector both in terms of number of employees and from the average monthly salary. Recent unprecedented measures to increase wages in the public sector will lead to a sharp break this balance and slope dangerously sharp salary increases (Figure 10).
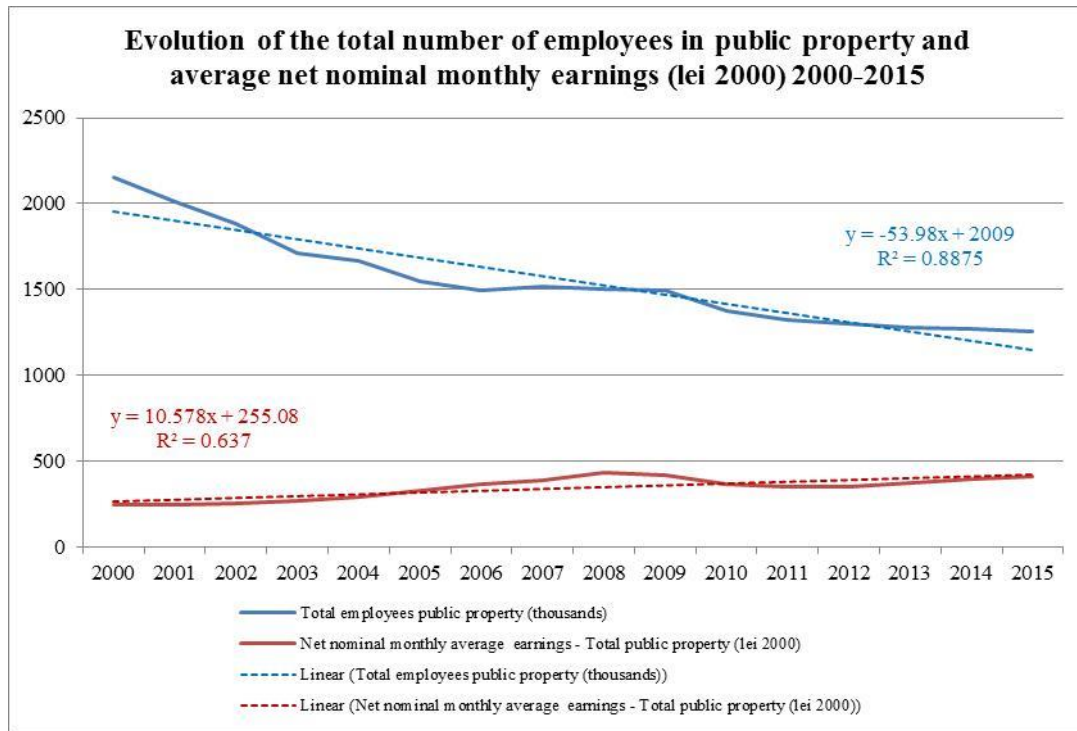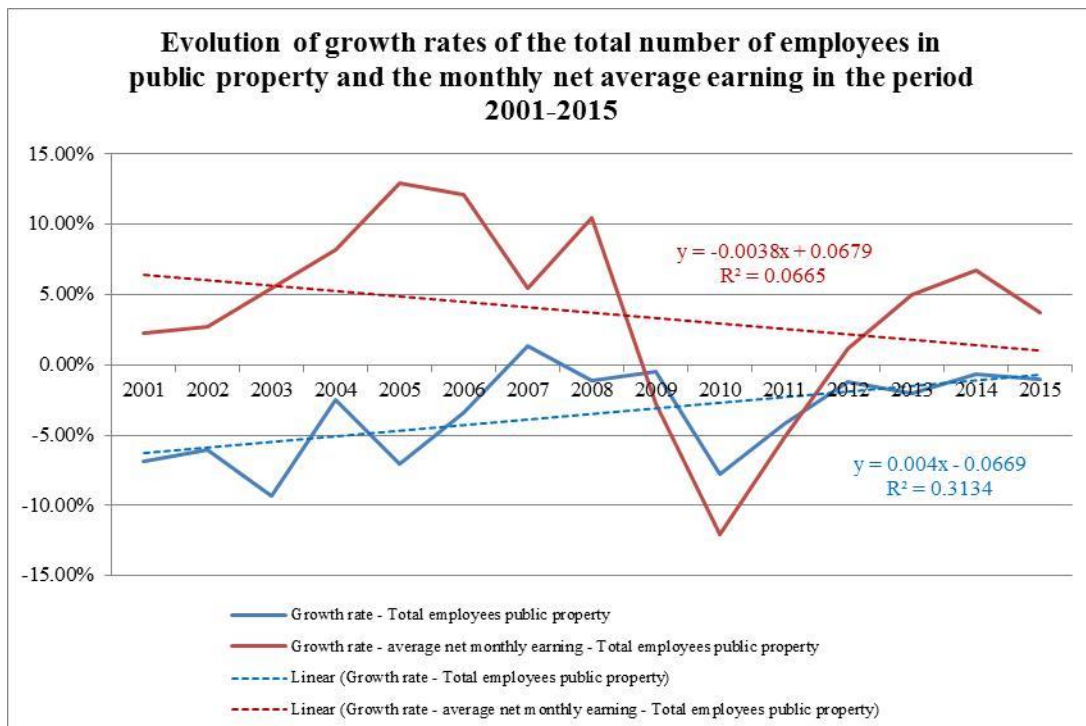
Figure 9

Figure 10

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Table 5. Evolution of labour productivity, growth rates of labour productivity and the variation of the growth rate of labour productivity in the period 2001-2015 for Romania

| Year	Labour productivity - total (lei/employee) (million lei 2000)	Growth rate - Labour productivity - total (lei/employee)	Variation in growth rate - Labour productivity - total (lei/employee)
2000	15717.3	-	-
2001	16807.32	6.94%	-
2002	17584.13	4.62%	-2.31%
2003	18096.63	2.91%	-1.71%
2004	19781.34	9.31%	6.39%
2005	19778.38	-0.01%	-9.32%
2006	20857.52	5.46%	5.47%
2007	21057.28	0.96%	-4.50%
2008	22763.83	8.10%	7.15%
2009	23093.01	1.45%	-6.66%
2010	24158.68	4.61%	3.17%
2011	23618.85	-2.23%	-6.85%
2012	23178.41	-1.86%	0.37%
2013	23971.1	3.42%	5.28%
2014	24248.15	1.16%	-2.26%
2015	24171.44	-0.32%	-1.47%

Source: INSSE and own analysis
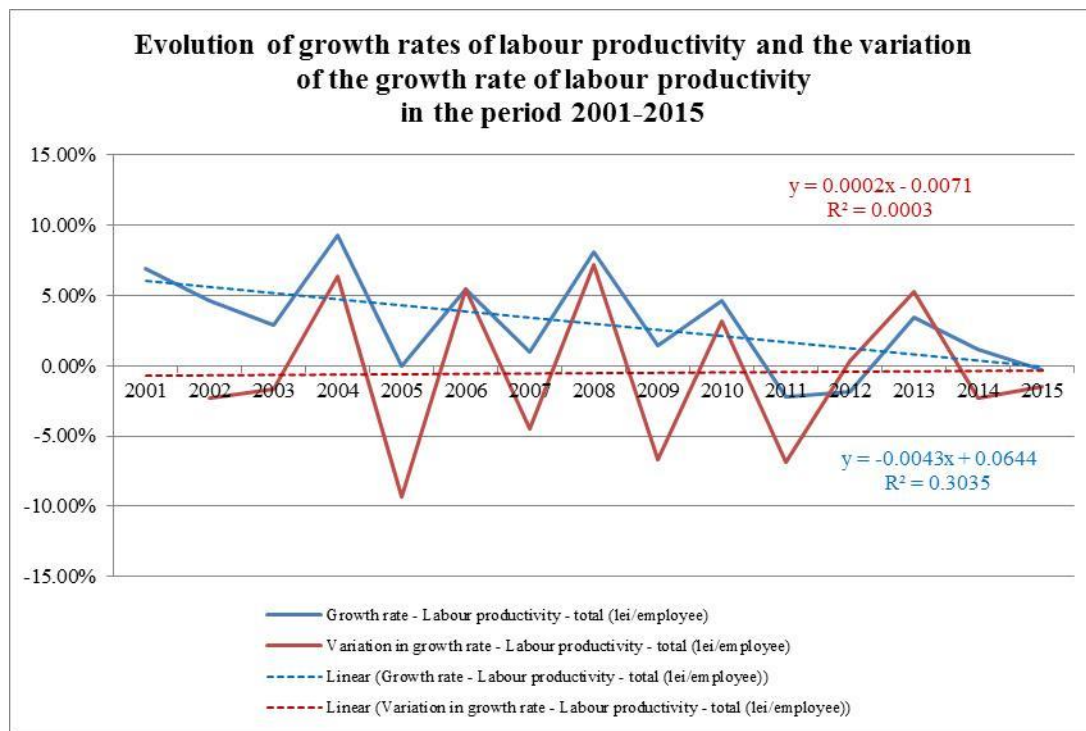
Figure 11

The most important dependence is the average wage of labor productivity. During 2001-2015, the rate of change in labor productivity has fluctuated, knowing evolving almost sinusoidal. Overall (figure 11) trend is negative (-0.43% / year) which gives prospects than worrying pace it maintained basically in

the future (with a variation of 0.02%). The causes of this continuous decrease productivity consist of increasingly poor training of the workforce and reduced investment in upgrading production capacity.

Dependence analysis of the evolution of the average monthly wage of labor productivity show decreasing trends, but at different rates. Thus, if the rate of decline in labor productivity is about 0.43% / year, the wage is only 0.18% / year (Figure 12).
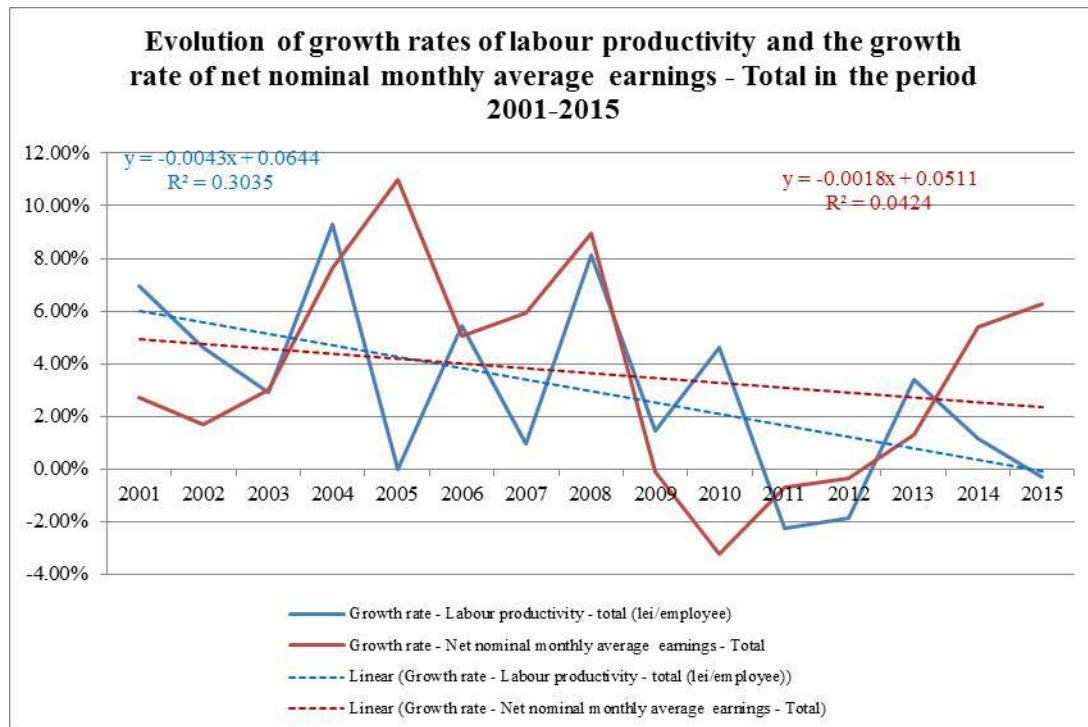

Figure 12

Pentru sectorul public, ratele de descreștere sunt aproximativ egale (-0.43% - productivitatea și -0.38% - salariul), dar în ultimii ani (începând cu 2010) tendința este una dezastruoasă în sensul că productivitatea scade continuu, iar salariile cunosc o dinamică pozitivă (fig. 13).

For the public sector, decay rates are about equal (-0.43% - productivity and -0.38% - wage), but in recent years (since 2010) is one disastrous tendency in that productivity decreases continuously, and wages are experiencing a positive trend (Figure 13).
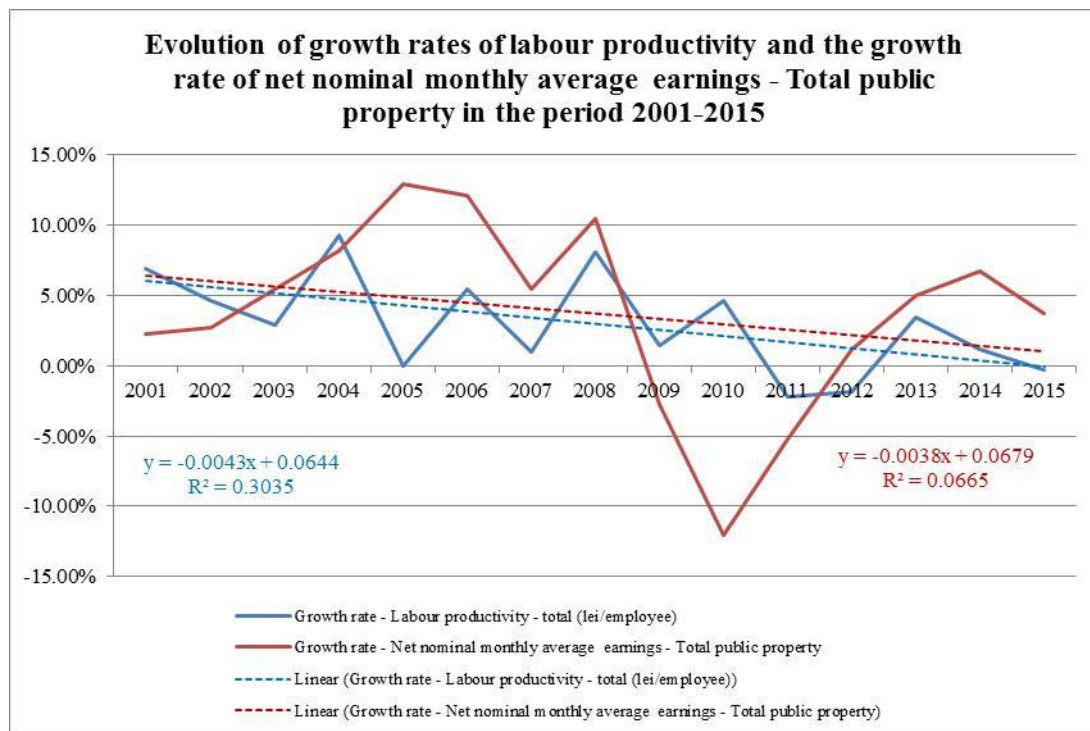
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E u r o E c o n o m i c a

Figure 13

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For the private sector, although the trend of variation of wages exceeds that of productivity (Figure 14), it follows with a lag of a year fluctuations of the latter, proving that the private sector adapts better productive act itself.
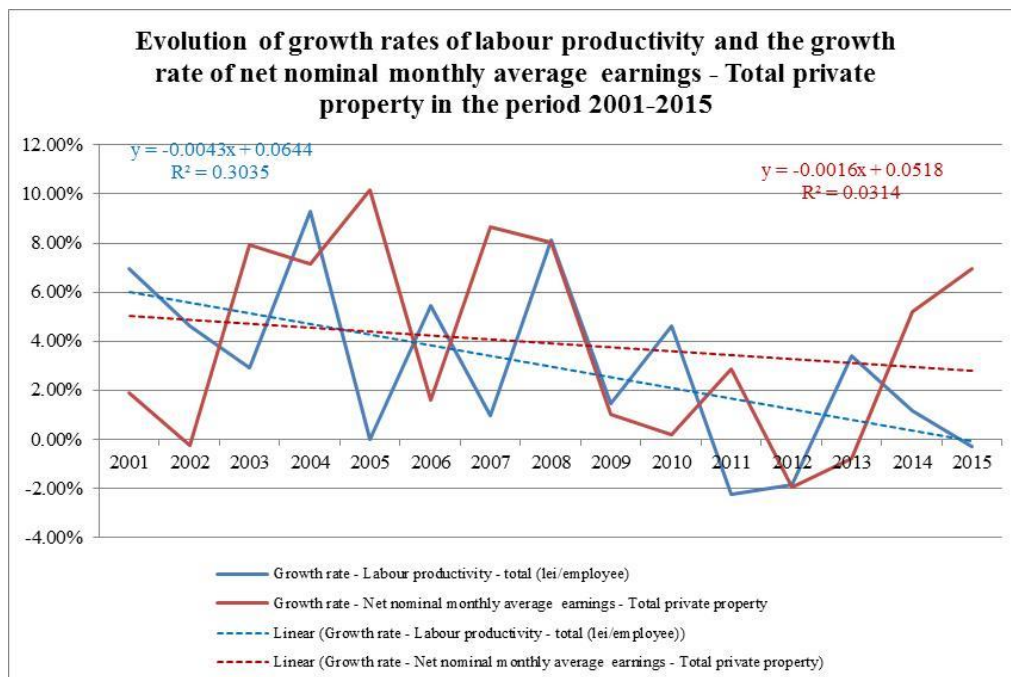

Figure 14

The analysis of the dependence between the growth rate of labour productivity and the growth rate - of net nominal monthly average earnings shows approximately a linear dependence from a labor productivity growth rate higher than 4%, which means a certain correlation with the overall pace of economic development of the country (Figure 15).
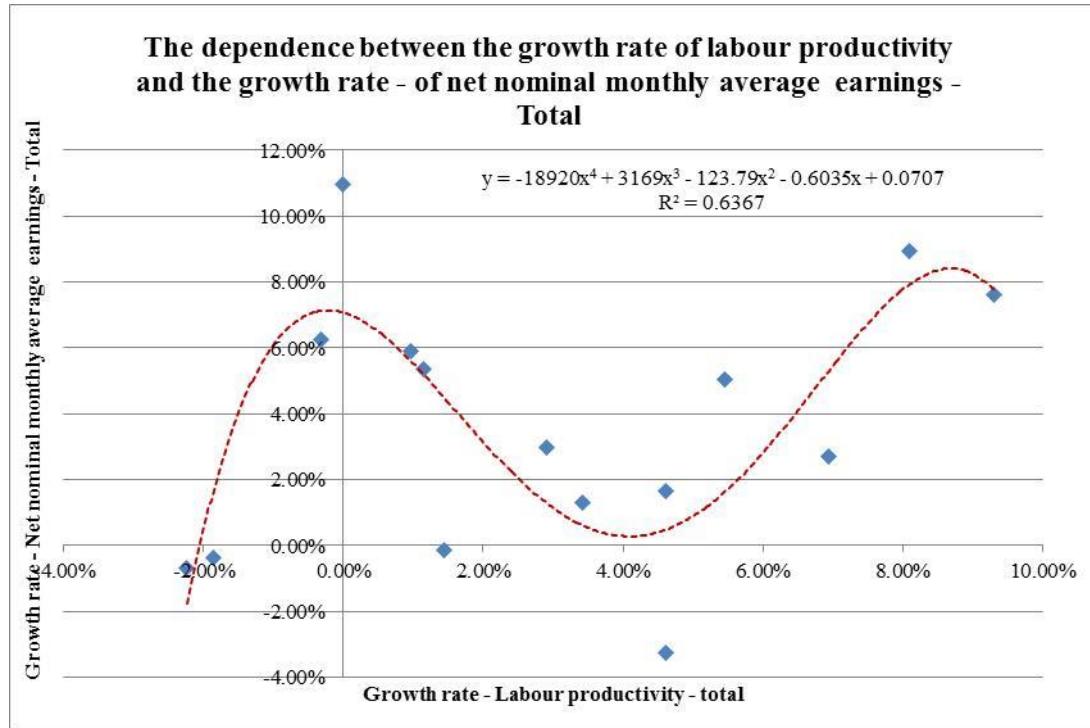

Figure 15

If in the private sector, an increase of over 6% in labor productivity drives wage moderation (Figure 16)), it is noted that in the public increases of over 4% causing wage significant increases which is totally absurd (Figure 17).
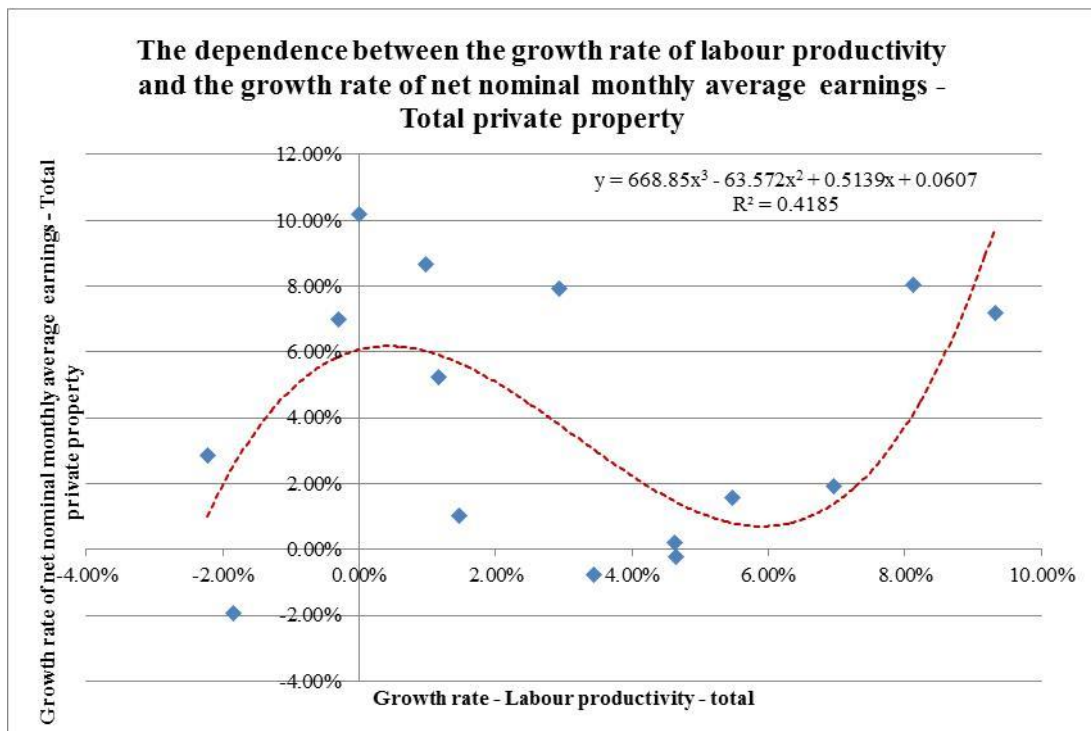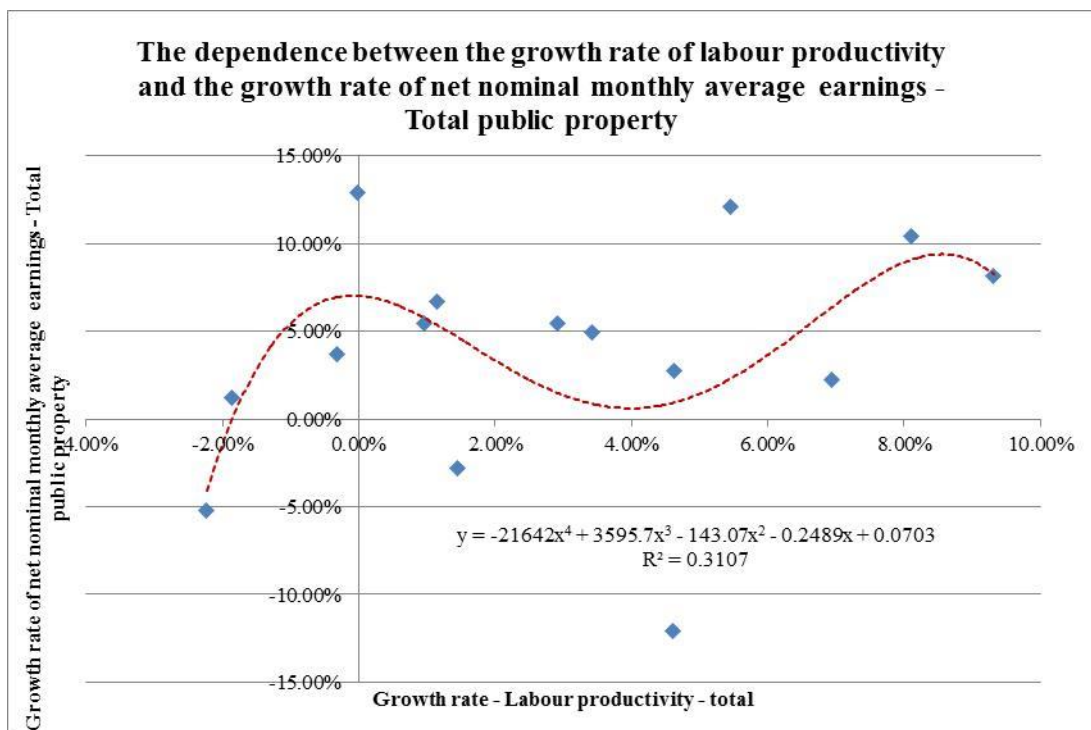
Figure 16

Figure 17

Analysis of the correlation between productivity and the change in the number of employees in the economy shows that, relative to existing economic capacities, number of employees is very high, its

growth leading to a massive drop in labor productivity (Figures 18,19,20). This does not mean anything other than poor endowments Romanian economy with means of production performance, gross labor being still the decisive factor of production growth.
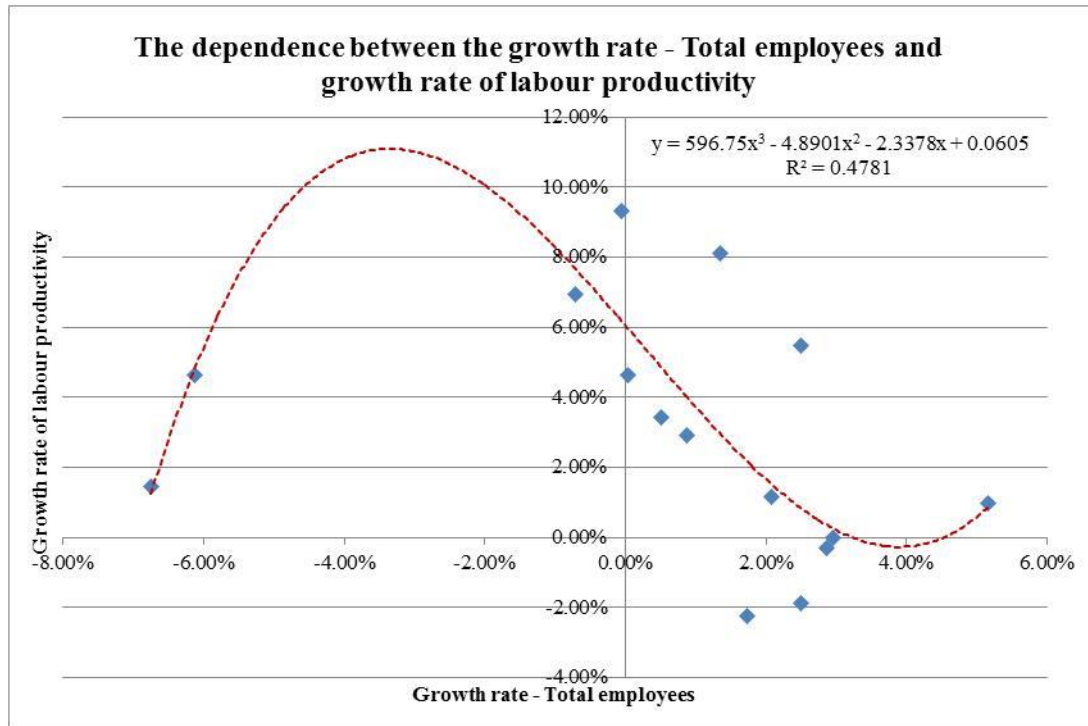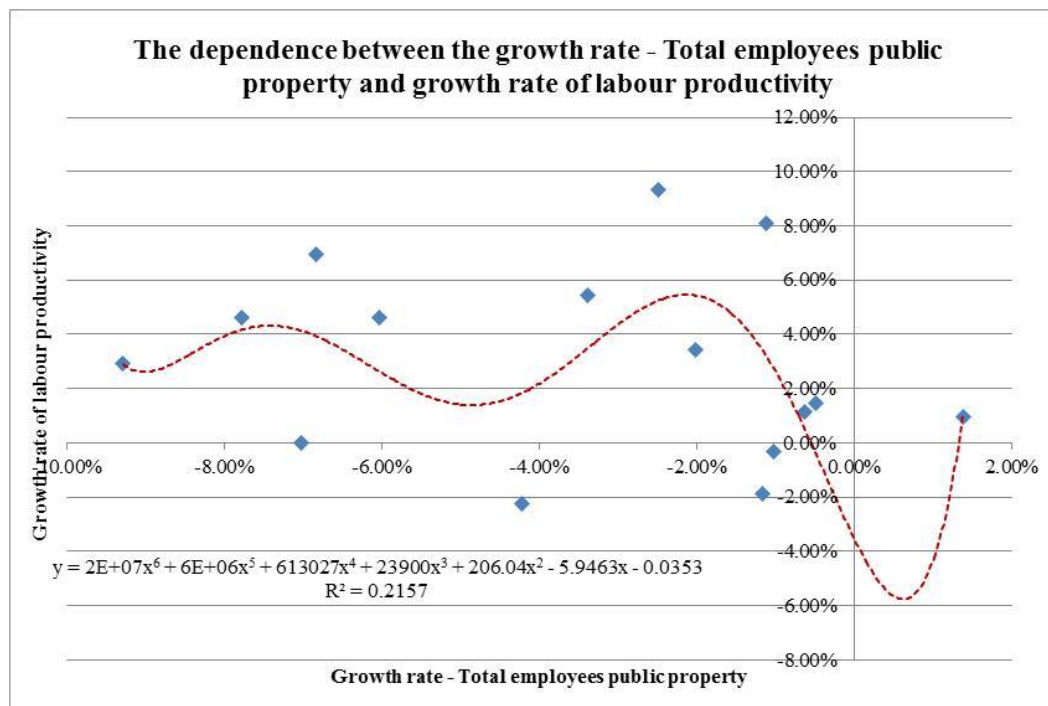

Figure 18

Figure 19

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The dependence between the growth rate - Total employees private property and growth rate of labour productivity

$y = -109454x^5 + 1766.6x^4 + 1216.2x^3 - 31.144x^2 - 2.8123x + 0.1104$

$R^2 = 0.3075$

Growth rate of labour productivity

Growth rate - Total employees private property

Figure 20

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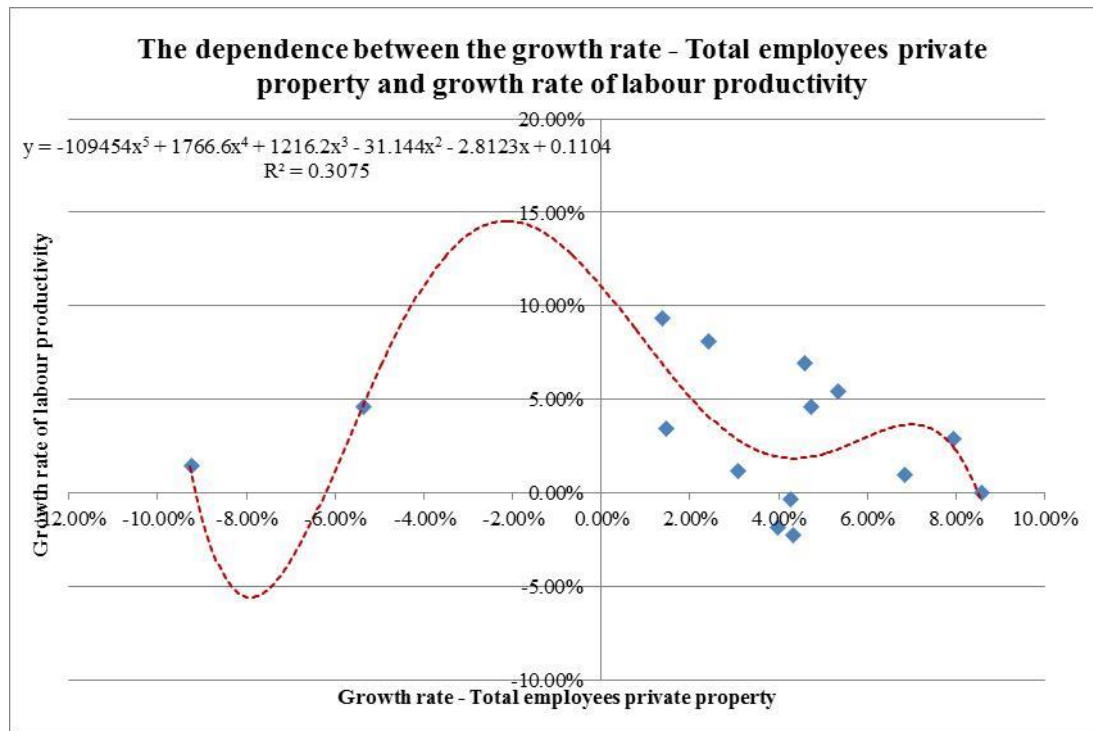## Conclusions

The conclusions of this analysis consist of a more than prudent wage policy in Romania, especially in the public sector, following closely the developments in the private sector - the engine of any market economy. Electoral or populist policies violate any rule macroeconomic imbalances leading to more than negative consequences in the long term.

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