Newly Created Enterprises' Effect
on the Gross Domestic Product

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Abstract

In Romania approximately two thirds of the national production is generated by the private sector of the economy, which is still relatively a low value compared to the weight registered in the developed countries. The economic crisis has also affected the private enterprise sector. Some major features: the decrease of the new enterprise foundation ratio, the growth of business liquidation ratio. This process was rather asynchronous compared with that of the developed European Union countries. Based on some data sets, this article operates an econometric modeling of the newly created enterprises' impact on the dynamic of national production, as measured by GDP.

Keywords: *entrepreneurship, newly created enterprises, DOSME (Demography of Small and Medium Enterprise).*

JEL classification: C20, L26, M13.

1. General Framework

Once the economical mechanism was restructured along with the event in 1989, from a centralized economy based on state ownership to a market economy, a certain overlapping of transformations took place: the transition from mainly state property to mixed property, the transition from a planned mechanism to free market, from a strict price control to general market pricing, the change in wealth distribution, in society classes, the transition from dictatorship to democracy.

Of all these processes, perhaps the most important one from the economic consequences standpoint was changing the property structure, which was made in two manners: by stimulating free initiative and property transfer. In Table 1 there are three indicators: the GDP dynamics based on 1995, the weight of the private sector in the GDP (%), the rate of new enterprises also based on 1995. The statistics are relevant in this process and can be accessed in REGIS[2].

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[2] REGIS is a statistic instrument for the evidence of identification data and some of the main economic indicators for all legal units which perform a social or economical activity. The registry is updated according to the following sources: Contributors' registry, Trade registry; Accounting balance of economic agents; Accounting balance of non-governmental operators; data and information supplied by the Authority for State Assets Recovery and by the Romanian National Bank; Statistic research organized by the National Institute of Statistics.

**Table 1. GDP dynamics, new enterprise foundation rate
and the weight of private sector in GDP**

Year	GDP Index (1995=100)	Mobile GDP Index (i/i-1)	Weight of private sector in GDP (%)	New enterprise foundation rate (1995=100)
1996	103.20	103.2	54.9	13.3
1997	98.14	95.1	60.6	13.0
1998	96.08	97.9	61.4	17.2
1999	95.70	99.6	63.7	14.4
2000	97.99	102.4	65.6	16.6
2001	103.60	105.7	68.0	16.3
2002	108.86	105.1	69.4	23.8
2003	114.58	105.2	67.7	31.7
2004	124.26	108.5	72.2	36.9
2005	129.48	104.2	70.4	42.2
2006	139.71	107.9	71.6	36.5
2007	148.51	106.3	72.0	42.2
2008	159.35	107.3	71.1	43.3
2009	148.03	92.9	70.3	32.6
2010	146.11	98.7	62.2	34.7

Data sources*:*

- *structural investigation in enterprises and other research made by the National Institute of Statistics concerning the activity of enterprises in industry, constructions, commerce and other services*
- *REGIS (Statistic registry of enterprises) managed by the National Institute of Statistics*

The foundation rate, calculated by comparison to the existent number in January 1st 1995, is placed in the field 13-17% until 2001, afterwards registering a significant growth, due to the improvement of the business environment, also leading to a growth of the national production expressed through the GDP (Dragan & Isaic 2009). The number of new founded companies exceeds 100,000 after 2003, with a maximum in 2005, than the process of enterprise foundation decreased further on (Table 2).

Figure 1 presents the foundation rates calculated by division of the newly founded enterprises to the existent number in January 1995. The absolute values of the new enterprises, from table 1, next to the rates illustrated in figure 1, highlight a dynamic trend, especially after the year 2000, which reflects a entrepreneurial environment more and more favorable, and if we correlate this fact with the age of the new entrepreneurs, mainly young people, we can appreciate the consolidation of the entrepreneurial market in Romania (Nicolescu et al 2012).
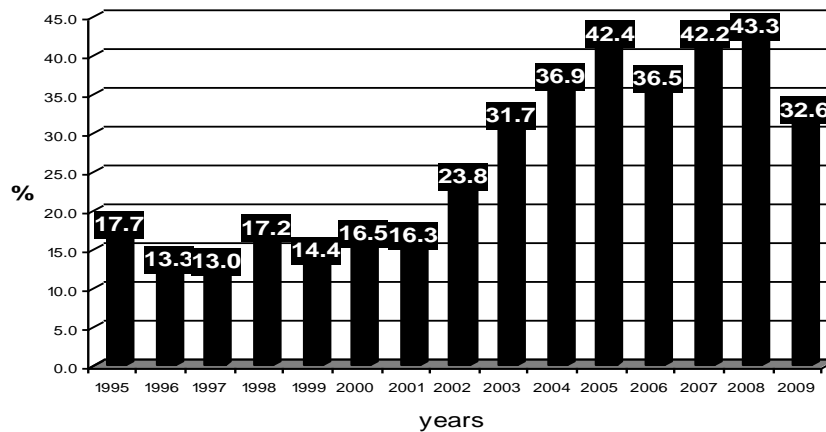
Figure 1 The new enterprise foundation rate in the period 1995-2009

Table 2 The number of new created enterprises

Period	Number of enterprises	Period	Number of enterprises
Stock – January 1995	388,180	2002	92,595
Newly founded in the year: 1995	68,772	2003	123,178
1996	51,684	2004	143,411
1997	50,516	2005	164,466
1998	66,841	2006	141,822
1999	55,852	2007	163,845
2000	63,941	2008	167,910
2001	63,383	2009	126,368

Source: New enterprises and the profile of the entrepreneurs in Romania, NIS, Bucharest, 2011

2. The Regional Dimension of the New Enterprises Foundation

By regions, the partial rates indicate a maximum dynamic of the Bucharest-Ilfov region 9.6% in 2007 and 6.1% for 2009, while the North-Western (4.7%) and North-Eastern (4.3%) regions register minimum dynamics. In the analyzed period, a certain diminution took place concerning the regional discrepancies, although the differences remain high (Dragan & Gogonea 2009). Thus, in 2001 the foundation rate was 2.9 % in the North-Eastern region while 1.3% in the Western region, which imply the necessity to apply in a different manner the policies for the activation of the regional economic environment. The weights by regions of development indicate high values in Bucharest-Ilfov, North-East and Centre regions (Figure 2). From the regional dynamics point of view, the

situation for the last three years concerning the foundation of new enterprises is as follows: North-East: 148.3%; South-East: 131.0%; South: 266.7%; South-West: 250.0 %;West: 246.2%; North-West:188.0%; Centre: 222.2%; Bucharest-Ilfov: 254.2%.

Figure 2 Territorial Distribution of the Newly Created Enterprises

The dynamics between the years 1995-2009 generated a certain attenuation of the territorial discrepancies. Except for the Bucharest-Ilfov region, which is in a special situation, we can observe an increased dynamics in the regions that still have low weights in the national total (South-West, West and South), which can be interpreted as an efficient response to the economic development stimulation actions, and to the private initiative in the less developed regions.

3. The Demography of the New Enterprises in Romania and in the European Union

Starting with the year 2000, the Romanian National Institute of Statistics is participating to the project led by Eurostat, "Business Demography", a project which includes most of the EU member states, the candidate states at that moment as well as the EFTA countries. The objective of the project is the comparative study of the business environment from the point of view of foundation, annulment, and survival of new enterprises[3].

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[3] *The demography of Romanian enterprises*, NIS, Bucharest 2005-2011

The main indicators for studying these processes as well as some international comparisons are presented below, comparative for the relevant years in the period 2001-2008. The last year of the series is 2008 as the research is not annual organized and the references were made to the state of the enterprises a year away from the moment of foundation.

The foundation of new enterprises is equivalent with the creation of a combination of production factors except no other enterprise is involved in the event. Foundation does not include the units which appear due to mergers, divisions or restructuring in some enterprises; it does not include entrances due to simple changes in the object of activity. A foundation appears when an enterprise starts from a green field and effectively starts its activity, if new production factors are created, especially new working places.

Also if a unit put to sleep is reactivated sooner than two years, this event is not considered a foundation. The measurement of this process is made through the indicator *foundation rate* which represents the number of newly founded enterprises to the total number of active enterprises in the reference year. In 2001, with a rate of 11.45%, Romania was placed just after Great Britain (11.87%) and Slovakia (18.29%). In 2005 also, the largest foundation rate is registered in Romania (18.29%) followed by Great Britain (13.68%) and Portugal (13.31%).

In 2008, we are placed at the middle of the European ranking with a rate of 14.78%, in a range starting from 3.12% for Cyprus and ending with 21.76% for Estonia. In 2008, relative to 2007, the largest increase in foundation rate is registered in Estonia (21.76%), followed by Latvia (14.92%) and Bulgaria (17.85%). Lithuania registers the largest decrease of the foundation rate in comparison to the year before (30.89% in 2008 as opposed to 37.62% in 2007) mainly due to the decrease in foundation rate in the industry of constructions. The countries which keep a constant trend are mainly EU-15 members, thus having strongly consolidated market economies. As for the distribution by activity areas, Romania keeps its top list position in all presented areas (industry, constructions, and services). Regarding the distribution by areas of activity, Bulgaria is on the first place in industry and services, and Hungary in constructions, in matters of increasing the rate of enterprise foundation. The highest rate by sectors of activity is registered in Estonia in industry as well as in services (13.48% and 19.55% respectively in 2008 in comparison to 7.03% and 13.80% respectively in 2007).

The annulment of a company occurs when a combination of production factors is dissolute with the restriction that no other company be involved in the event. Annulments don't include units involved in mergers, takeovers, divisions of restructures; they also don't include exits from sub-populations due to a change in the object of activity. Furthermore, an enterprise is counted as annulled only if it is not reactivated in less than two years. The measurement of the annulment process is made through the indicator *annulment rate* which represents the ratio between the number of annulled enterprises and the number of active enterprises in the reference year.

In 2004, the highest annulment rate was registered in the Czech Republic (12.84%), a rate higher than the foundation rate for the same year (10.00%). Annulment rates higher than 10% were registered in Portugal (12.83%), Estonia (12.24%), Bulgaria (11.72%), Great Britain (11.36%) and Romania (10.46%). There are no obvious trends of increase or decrease between sectors of activity, however as in the case of foundation rates, in the services sector the annulment rates are the highest. In 2007, the highest annulment rate is registered in Lithuania (20.29%) while the smallest rate is registered in Cyprus (2.20%). The states which registered annulment rates higher than 10% are: Slovakia (14.03%), Bulgaria (13.90%), Portugal (13.88%), Latvia (11.77%) and Great Britain (11.23%).

Similar to the *survival rate*, we don't observe extreme values for the annulment rates. The exception is Latvia, where in 2004 4.35% of the enterprises were ceasing activity and in 2007, the weight increased to 11.77%. In the rest of the states, the values are close throughout the four years. An analysis of the annulment rate at the level of the European Union shows that there is obvious increasing or decreasing trends among sectors of activity.

Survival rate is defined by the continuity in the activity of the enterprise in time. Thus, an enterprise created in year *t* survived until year *t+x* if it is still active in year *t+x*, even if there was a change in ownership. It is measured through the indicator survival rate (at year 1, 2, 3, and 4 since foundation) and represents the number of enterprises which survived in the reference year divided by the newly created enterprises from the previous one, two, three or four years. The highest survival rate at four years belongs to Sweden (three quarters of the newly created enterprises in 2001 were still active in 2005, or the ones founded in 2004 were still active in 2007), while in Romania, only little over half of the enterprises founded in 2001 lasted for four years, a situation slightly improved in the following years, as the survival rate stabilized at 87-88%. A small survival rate for four years is also registered in the Czech Republic, where nearly half of the enterprises survive the business environment. A higher variation of the two-year and one-year survival rates is registered for the industry sector in Luxembourg, where the two-year survival rate is around 50% and the one-year survival rate is around 90%.

Comparing the data on enterprise foundation, we notice that the rate in Sweden is inversely proportional to the survival rate. Thus, Sweden registers a small *foundation rate* but high survival rates for two, three and four years. Unlike the enterprise foundation rate where we can observe a clear difference between new and old EU state members, for the survival rate the values are close.

Creating new enterprises also has a positive impact on the creation of new work places. In Romania, in 2001, almost 115,000 new work places were created due to the foundation of new enterprises, in 2005 reaching the level of approximately 182,000, in 2007 to 186,000, and later decreased to 165,273 in 2008 due to the word wide crisis in the economy (Nicolescu et al 2010). To increase comparability, the indicator *average number of persons employed* in a new enterprise becomes relevant. In our country, the indicator was 2.39 in 2005 (0.34 in Finland, 2.21 in the Czech Republic and 2.22 in England). Thus, in matters of enterprise dynamics and demography, Romania is placed in the trend of new EU members which moved to market economy after the 90s.

4. Econometrics of Dependencies

For the regression analysis we chose as dependent variables the GDP increase rate vs. 1995, the GDP dynamics on mobile base, while the proposed independent variables are: the weight of the private sector in the GDP and the rate of new enterprise foundation.

IPIB_1995 – GDP increase rate vs. 1995;

IPIB_AN_ANT (*i/i-1*) – GDP increase rate computed with mobile base;

POND_SECT_PRIV_PIB - The weight of the private sector in GDP;

RATA_CREARII_DE_FIRME – New enterprise foundation rate

For the regression analysis we chose as dependent variables the GDP increase rate vs. 1995, the GDP dynamics on mobile base, while the proposed independent variables are: the weight of the private sector in the GDP and the rate of new enterprise foundation.

To decide which explanatory factors are included in an econometric model proposed for estimations, we computed the correlation coefficients in order to test the statistic significance of the connections between independent variables and the proposed dependent variables (Greene 1993 and Pecican 1996). Taking into account the interdependent processes which exist between certain exogenous variables, a major issue in building the econometric models was the reduction or elimination of a possible multicollinearity of explanatory variables which would affect the results of the estimated regression models (Pindyck 1991). In the approach of the multicollinearity of explanatory variables, we built models which would consider this restriction, more specifically, we included in the models built and tested only those factors which were correlated with the dependent variables followed, the GDP increase rate, but which were not correlated among them. All analyses regarding the statistic description of data series, the analysis of correlations and estimation of regression models were made exclusively using the functions of EViews. The significance threshold chosen to test hypotheses is $\alpha=0.05$.

4.1. The correlation analysis between variables

In order to decide which variables should be introduced in the regression models which are to be estimated, it is necessary to analyze the correlation between variables, GDP dynamics and the variables considered to have the potential of explaining dependent variables. Just as important is the analysis of the connections between exogenous factors in order to eliminate as much as possible an eventual multicollinearity which would influence the regression estimation process and would affect the results. The series, based on which the correlation coefficients were computed, is composed of 15 observations, representing the data of the variables mentioned above.

The correlation coefficients of the possibly explanatory variables in determining dependent variables are presented in the table below along with the value of the t-test and its significance threshold (table 3).

Table 3 The correlation between variables

Correlation t-Statistic Probability	IPIB_1995	IPIB_AN_ANT	POND_SECT_ PRIV_PIB	RATA_CREARII _DE_FIRME
IPIB_1995	1.00000			
IPIB_AN_ANT	0.205699 0.757867 0.4620	1.00000		
POND_SECT_ PRIV_PIB	0.713721 3.673967 0.0028	0.431229 1.723281 0.1085	1.00000	
RATA_CREAR II_DE_FIRME	0.893304 7.166176 0.0000	0.429113 1.712910 0.1105	0.821433 5.193220 0.0002	1.000000

As it can be noticed in the table above, all variables proposed as independent present a strong correlation (coefficient > 0.71) with the GDP increase rate vs. 1995, being statistically significant (t-statistic probability < 0.05), but none of them is significantly correlated to the GDP increase rate vs. the previous year (t-statistic probability > 0.05). Consequently, the regression model will be built having as dependent variable the GDP increase rate vs. 1995 and as explanatory variables the two variables which are correlated with it. Taking into account the observations above, we propose the following regression models for estimation.

4.2. Defining the simple regression model

The regression model we used is:

$$IPIB\_1995 = C(1) + C(2) \cdot RATA\_CREARII\_DE\_FIRME + \varepsilon$$

The estimated results of simple regression equation using the OSL model (figure 3) show that the coefficients of the variable responsible for the foundation rate as well as the intercept are statistically significant, the probabilities associated to the *t*-test being inferior to the significance level (prob. $0.00 < \alpha = 0.05$).

The value of the parameter estimated for the explanatory variable is 1.73, which means that an increase of 1% in the enterprise foundation rate leads to an average increase of 1.73% in the GDP increase rate vs. 1995.

The adjusted R‑squared is 0.80 which means that 80% of the variation of the dependent variable is explained by the variation in creating new private companies.

F-statistic validates the model as a whole, the associated probability being lower than the significance threshold (prob. $0.00 < \alpha = 0.05$). The Durbin-Watson statistic (DW) which tests the null hypothesis (Gujarati 2003) according to which the errors are not auto-correlated is 0.62. The values regarding the lower and upper limits for a DW test with a number of 15 observations ($n=15$), two parameters ($k=2$) and a significance threshold $\alpha=0.05$ are $d_1=1.08$ and $d_2=1.36$. The DW statistic is thus in the interval 0 and d_1 ($0 < 0.62 < 1.08$) which indicates an autocorrelation of the errors.
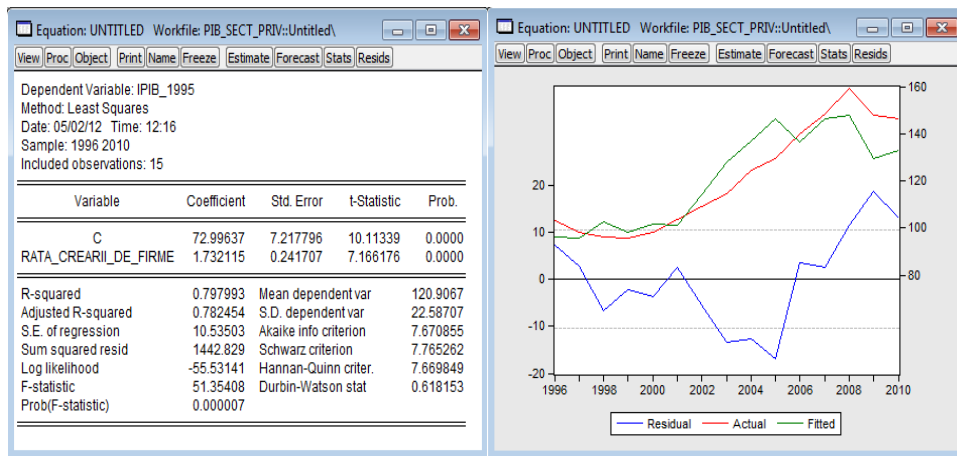
Dependent Variable: IPIB_1995
Method: Least Squares
Date: 05/02/12   Time: 12:16
Sample: 1996 2010
Included observations: 15

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	72.99637	7.217796	10.11339	0.0000
RATA_CREARII_DE_FIRME	1.732115	0.241707	7.166176	0.0000

R-squared	0.797993	Mean dependent var	120.9067
Adjusted R-squared	0.782454	S.D. dependent var	22.58707
S.E. of regression	10.53503	Akaike info criterion	7.670855
Sum squared resid	1442.829	Schwarz criterion	7.765262
Log likelihood	-55.53141	Hannan-Quinn criter.	7.669849
F-statistic	51.35408	Durbin-Watson stat	0.618153
Prob(F-statistic)	0.000007		

Figure3 Regression model indicators	**Figure 4 Illustration of variable GDP for the private sector**

In the figure 4 there is a graphic illustration of the values observed (in red) and the estimated ones (in green) for the dependent variable along with the values of the residual values (in blue).

The hypothesis of normal distribution for the residual value is verified by the analysis and calculations of the statistics regarding its distribution. Thus, we notice in figure 5 that the distribution of errors is close to a normal one considering the value of the Skewness coefficient close to zero and that of the Kurtosis is 2.23, indicating a nearly symmetrical and slightly skew distribution; the Jarque-Bera test also certifies that this distribution is a relatively normal one (Jarque &Bera 1981) by the fact that the probability associated to the test is higher than the significance threshold ($0.83>\alpha=0.05$) thus accepting the null hypothesis according to which the distribution is normal.

The hypothesis regarding the homoscedasticity of errors (the even spreading of errors) is verified as below by computing the Breusch-Pagan-Godfrey test (figure 6) (Breush & Pagan 1979).

Considering that the probability associated to the test is lower than the significance threshold ($0.04<\alpha=0.05$), we reject the tested hypothesis according to which the errors are evenly spread (homoscedasticity).

Comparing the statistics determinant in selecting the best model, respectively the determination coefficient R^2, the F-test, the Akaike (AIC) and Schwarz (SIC) informational criteria, and considering the statistic significance of the regressors' contribution to the dependent variable (Akaike 1974 and Schwarz 1978), we can state that the best model of the four previously estimated is the last one, because the values of the R-squared, as well as the adjusted R-squared and F-test, are greater than the values obtained for the others models (Gayawan & Ipinyomi 2009). Moreover, the values found for the Akaike criterion and Schwarz criterion are lower than those obtained for the others models (Table4) (Hossian 2002).
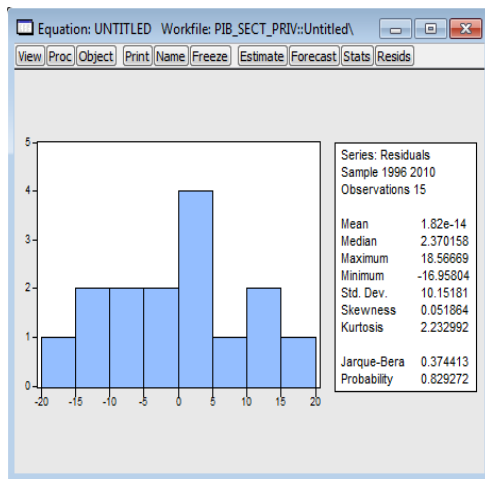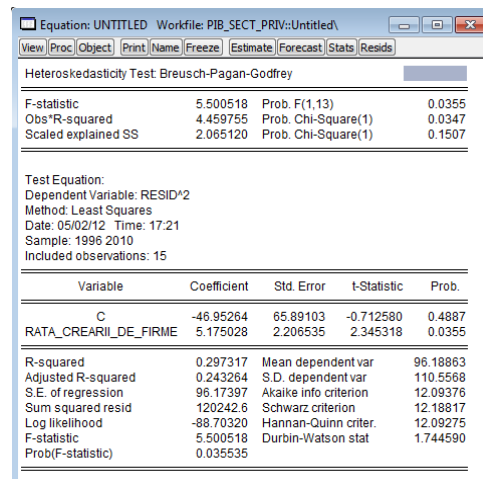
Figure 5 The distribution for residuals

Figure6 Breusch-Pagan-Godfrey test

Table 4 Regression indicators summary

Indicators	Regression model
R^2	0.80
Adjusted R^2	0.78
F-test	51.35
AIC	7.67
SIC	7.77

Conclusions

First of all, Romania's economy consolidated the functional market economy characteristic through the high weight of the private sector in the national production. The economic crisis in the past years had a strong impact on the national economic environment thus becoming a break in the development of private initiative. From the point of view of enterprise demographics, the foundation, annulment and survival rates are placed at medium European level, closer to ex-communist countries and farther away from Northern countries where enterprise foundation rates are lower, as well as mortality rates.

The enterprise foundation rates data series, GDP dynamics and weight of private sector in national production are series built for the period 1995-2009 (the years for which we were able to build homogenous and comparable series) were used to identify an impact model for the two factor variables (new enterprise foundation rate and private sector weight in GDP) in the national production dynamics. The model with the best validation highlights the strong connection between the new enterprise foundation rate and GDP increase thus explaining the compression of the national production at the moment of crisis out-burst and business environment degradation.

Finally, one can state that encouraging the creation of new companies and consolidating the private sector in the economy is a sure means to increase the economic performance of Romania.

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