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A Practical Method to Measure Entrepreneurship´s Reward. A Note.

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A PRACTICAL METHOD

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A NOTE.

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ABSTRACT

In the present note, an effort will be made for a contribution to the economic theory by introducing a practical method to estimate entrepreneurship's reward. As an example, a regression, based on the estimation of entrepreneurship's reward, with banking panel data will yield the same main results as in the article of *Governance Structures, Efficiency and Firm Profitability*, by E.E. Lehmann, S. Warning and J. Weigand, MPI, that firms with more efficient governance have higher profitability.

Keywords: bank, profitability, entrepreneurship
JEL classification: E50, L25, M13

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PART 1. THEORY
(A PRACTICAL ESTIMATION OF ENTREPRENEURSHIP'S REWARD)

I found the discussion paper of Lehmann et al. very interesting, because it indirectly measures the effects of entrepreneurship on company performance. Hence, I take the opportunity to make a small contribution to the economic theory by introducing a practical method for the estimation of entrepreneurship's reward (which could be otherwise named as executive's compensation, or manager's pay). To the best of my knowledge, there is no previous empirical work estimating entrepreneurship's reward.

In the present note I will reproduce the main parts of the work of Georgiou and Kyriazis (forthcoming) in which there is a method to estimate entrepreneurship's reward in the banking sector. Further, I will use an econometric example and finally after modifying this method, I will propose a way to estimate entrepreneurship's reward in any other sector.

I start from the banking sector. Let [$\mathbf{r_L}$] denote the average annual interest rate of selling capital (lending rate), [$\mathbf{r_D}$] to stand for the average annual interest rate of buying capital (deposit rate), and [**i**] for the average annual inflation rate. Hence, the breakdown of lending rate into its components as in the next equation:

$$(1+r_L) = (1+ i)(1+r_D)(1+r_E) \qquad (1)$$

where: $\mathbf{[r_E]}$ expresses the residual as the average annual reward of entrepreneurship.

The above mentioned equation reminds us of the estimation based on the rule of thumb: "a (say) 8% interest rate for a loan looses (say) 3% from inflation, (say) 2% from the deposit interest rate, and the remaining 3% is left to the entrepreneurship reward". We assume that wages and salaries increase at the same rate as inflation does. This assumption is rather realistic, for the labour annual contracts are closely linked to inflation. Entrepreneurship includes the risk of undertaking a venture, the organization risk, the new idea, the stress of realization, and so many other things contrary to the other factors (labour, and capital) that have no initiative, and they just execute what they are paid for, in a situation of a given state of art and a given production function. Hence, according to the above mentioned and after knowing the prices (costs) of labour and capital, we are able to estimate the entrepreneurship reward as:

$$r_E = \frac{(1+r_L)}{(1+i)*(1+r_D)} - 1 \qquad (2)$$

The estimation of $\mathbf{r_L}$ is given by:

$$r_L = \frac{\text{all interests to be received + incomes}}{\text{all credits}} \qquad (3)$$

The estimation of $\mathbf{r_D}$ is given by:

$$r_D = \frac{\text{all interests to be paid + expenses}}{\text{all deposits}} \qquad (4)$$

Hence, based on equations (3) and (4) we estimate [$\mathbf{r_L}$] and [$\mathbf{r_D}$] (using banking published balance sheets and income statements) and from (2) we derive the value of [$\mathbf{r_E}$]. This process is easy and can be done by any computer.

Our definition (2) is oversimplified, for it assumes only one banking product (service) sold at the price of $[\mathbf{r_L}]$ as well as one type of source of funds bought at the price of $[\mathbf{r_D}]$ and finally one type of labour paid at the price if [**i**]. The advantage however of (2) is that it estimates directly the cost (price or reward or remuneration) of entrepreneurship $[\mathbf{r_E}]$ as a function of the average cost of capital bought $[\mathbf{r_D}]$, the average price of capital sold $[\mathbf{r_L}]$, as well as the average cost of labour [**i**].

In fact **roe** is different from $[\mathbf{r_E}]$. This is due to the fact that these two variables are defined differently. $[\mathbf{r_E}]$ is previously defined by equation (2), while **roe** is defined as:

$$roe = \frac{\text{net profits}}{\text{equity}} \qquad (5)$$

Roe refers to the profitability of the owners, and it measures the return on the proprietor's investment in the company (In other words it is the return to equity). $[\mathbf{r_E}]$ refers to the price of entrepreneurship as a highly skilled factor of production. It should be noted that entrepreneur (in this context) is not necessarily the proprietor (owner) of the bank. It could be a top manager, or an executive. Nevertheless, since the interests of proprietors and top managers are going the same direction, it is on an ex-ante basis expected that there should be a positive relation between **Roe** and $[\mathbf{r_E}]$. It should be noted that the same conclusion will apply between **ROA** and $[\mathbf{r_E}]$.

PART 2. AN ECONOMETRIC EXAMPLE WITH PANEL DATA

2.1 The Formulation of the Model

I test the hypothesis that an efficient governance (measured in terms of the executive's compensation $[\mathbf{r_E}]$) is positively related to profitability (measured in terms of **ROA**).

The model is shown in (6) as:

$$\mathbf{ROA}_{it} = c_0 + c_1 \mathbf{r_E}_{it} + \text{error}_{it} \quad (6)$$

The subscript [i] refers to the bank and the subscript [t] refers to the year. Data are taken from balance sheets and income statements from Bloomberg, which are elaborated. From the published balance sheets and income statements I estimated **roa** and $\mathbf{r_E}$. These data are annual, refer to the period 1997-2000, and cover banks of the following countries: Belgium, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain and UK. The produced sample has 168 observations in total. I have selected the "old" members of the eurozone, for I believe that the new members are not harmonized to the eurozone yet. Hence, the sample is homogenous. The countries examined and the banks per country and per year are in sum shown in table 3. It is ex-ante expected $c_1>0$. Panel data equation (6) will be elaborated based on the software package EVIEWS.5.

2.3 Econometric Comments

The method of EGLS (period weights) will be used. I used this method because I needed to handle heteroskedasticity. According to the work of Yaffee (2003, p.10) the methods of "fixed effect" as well as "random effect" are not efficient when there is heteroskedasticity (either between time periods or between cross sections). In large samples however the method of EGLS or FGLS (feasible generalized least squares) can handle the above-mentioned problem of heteroskedasticity. In fact, and more precisely, in the earlier years of the period 1997-2000 national economies were not harmonized yet, which caused a period heteroskedasticity. In other words, the selection of the above method as the best one, can be explained by the fact that it gives more weights to recent years in which

monetary harmonization took place. The results are shown in table 1 and diagnostic tests in table 2. The estimated regression is:

$$ROA = 0,007 + 0,024 r_E \qquad (7)$$

I observe that model (6) estimated as in (7) meets the three required criteria of homoskedasticity, specification and normality. Further there is not autocorrelation. The constant term is positive and statistically significant. Besides, the coefficient of $\mathbf{r_E}$ is positive and statistically significant, as initially assumed. The adjusted R^2 is high.

PART 3. CONCLUSIONS

The above equation (6) used as an example pointed out that entrepreneurship reward is measurable as well as it can be used in econometric analysis to prove that firms with more efficient governance have higher profitability. This example refers to the banking sector, but after a modification, it can be used in any firm.

This modification will be that [$\mathbf{r_L}$] can be replaced by the company's average product price rate (and we ignore (3)), as well as that [$\mathbf{r_D}$] will be now the average cost of loans the company bears for the working capital as well as the fixed assets (we ignore (4)). Hence, using again (2) the estimation of [$\mathbf{r_E}$] is feasible to any other company outside the banking sector.

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APPENDIX

Table 1: Results

Method	**EGLS (Period weights)**
Constant	0,007 (24,62)
r_E	0,024 (6,35)
Adjusted R^2	0,770
Durbin-Watson	2,290

Table 2: Diagnostic Tests

TESTS	EGLS (Period weights)	Critical values (at 95%)
Heteroskedasticity	0,220	3,904
Heteroskedasticity	0,221	3,904
Heteroskedasticity	0,222	3,841
Heteroskedasticity	0,372	5,991
Heteroskedasticity	0,090	7,815
$RESET_1$	0,070	3,841
$RESET_2$	0,002	5,991
$RESET_3$	0,000	7,815
Normality	3,446	5,991

Test 1: Regression of the squared residuals on X. That is, $u_t^2 = x_t'\gamma_1 + v_{t,1}$

Test 2: Regression of absolute residuals on X. That is, $| u_t |= x_t'\gamma_2 + v_{t,2}$ (a Glejser test)

Test 3: Regression of the squared residuals on $\hat{Y}$

Test 4: Regression of the squared residuals on $\hat{Y}$ and $\hat{Y}^2$

Test 5: Regression of the log of squared residuals on X (a Harvey test)

Test 6: Regression of residuals on $\hat{Y}^2$

Test 7: Regression of residuals on $\hat{Y}^3$

Test 8: Regression of residuals on $\hat{Y}^4$

Test 9: Normality test

Table 3. Data Collection

Year	1997	1998	1999	2000
Belgium	3	3	3	3
France	6	6	5	5
Germany	4	5	4	4
Greece	8	9	9	10
Netherlands	3	3	3	3
Ireland	2	2	2	2
Italy	4	4	5	5
Portugal	1	2	2	2
Spain	4	4	4	4
UK	5	5	5	5
Total	**40**	**43**	**42**	**43**

Source: Bloomberg, calculations are mine.