THE ECONOMETRICS OF THE FORECASTING OF FINANCIAL RESOURCES, A MAIN COMPONENT OF THE FINANCIAL MANAGEMENT

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Abstract: The paper intends to emphasise the importance of budget resources forecasting for long periods of time, within the financial management. An as accurate as possible forecasting of the volume of financial resources will represent the basis for the future projections of the expenditure of local communities, as they are regulated by law, knowing that one of the principles representing the basis of budget making is that of the balanced budget. To the same extent, the volume of the budget liquidities will depend on the rigorousness of the design of the volume of financial resources.. Beyond the abstract character of the mathematic calculus made by specialists in econometrics, the financial manager is also interested to know the forecasting techniques so that he/she can draw up the income and expenditure budget, the basis for the implementation of the economic-social development strategies of the local communities. The financial management remains a fundamental component of the public management through the theoretical-methodological arsenal made available for the loan officer.
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Without economic mathematics, there is no philosophy of the financial management. Without financial management, there is no philosophy of economic mathematics. Without both of them, the manager lacks the power and the accuracy of decision.

This is why an essential component of the financial management is the **budget resources provisioning** for long periods of time, the basis to make the income and expenditure budget. Why is it necessary to accurately know the current and future evolution of the structure of financial resources?

The answer to this question has different meanings on the cash flow and their balance for each local community!

First of all, an as exact as possible forecasting of the volume of financial resources will represent the base for the future projections of the local communities' expenditure, as they are regulated by law, knowing the fact that one of the principles on which the drawing up of the budget is based is that of the **balanced budget**.

Second of all, the volume of the budget liquidities will depend on the design of the volume of financial resources. Any over-dimensioning of the revenues will have as a consequence the over-dimensioning of expenditure which will endanger both in the present and in the future the liquidities, the budget mechanism being simple, yet dangerous: the budget credits approved and open ensure the financing of the public services and if over-dimensioning the revenues the risk of payment default is major.

On the contrary, an under-dimensioning of the revenues will lead to an under-dimensioning of the local communities' expenditure, the immediate consequence being an increase without foundation of the volume of liquidities.

Then existence of some liquidity surpluses is not useful for the local communities as long as their obligation is to keep them in the State Treasury without paying interest.

The implications of the surpluses are much more profound, they can be the result of some under-financings of public services, a fact which will lead to an ill-judged increase of debts to the goods and services suppliers which unpaid on settling day will attract the payment of some compensatory financings and penalties.

Isn't it true that the budget resources forecasting becomes extremely important when making the income and expenditure budget, due to its different implications on the budget execution?

That is why in order to help the public manager, the latter should have at his/her disposal an entire portfolio of instruments helping him to make the decision to draw up an as rigorous as possible income and expenditure budget. What has the science given to the budget so far? The classical and modern methods in the specialty literature[639] are witnesses, out of which we mention:

- **the automatic method** evaluates the indicators regarding the incomes and expenditure starting from their execution in the period t-1;
- **the diminishing method** evaluates the same indicators starting from the budget execution on a five consecutive year interval previous to drawing up the income and expenditure budget;
- **the direct evaluation method** is based on the evaluation of each income or expenditure, taking into consideration the preliminary executions for the current year and the predictable evolutions with budget implications for the following year;
- **the planning, programming, budgeting method (PPB),** considered as a modern American method, is based on the restructuring of the budget following the succession: "structure-objectives-programme";

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[639] *Iulian Văcărel (coordinator) – Finanțe publice, ediția a III a, Ed. Economică, București, 2003, p. 725*

- **the management by objectives method** is also an American type method which emphasises the finality of each field of activity, being the starting point in the implementation of the budget on programmes;
- **the Zero Base Budgeting method,** known also as "cost-advantage method", the intention being to critically examine all the expenses considering their necessity and opportunity;
- **the method of rationalisation of budget choices** (Rationalisation de Choix Budgetaire) a method based on the use of calculus, analysis, forecast, organization and management techniques, of French inspiration.

The income forecast methods, both classical and modern, in order to be useful for the local communities must comply with the following criteria:
- to be clear and simple, so that the specialists without high mathematic, statistic or economic education can use it within the budgetary process;
- to require only easily obtainable data or information in due time from the recordings drawn up at the level of local administration;
- to be possible to manually perform the calculus, for there are still local public administrations which do not have computers.

Beyond the methods studied and commented in the specialty literature, we can analyse the "arsenal" of methods that the modern science provides. The forecasts, as finality of the financial econometrics, ensure for the financial manager the answer to the question: Which will be the provisioned level of the financial resources in the current and future period?

"And if you must forecast, forecast often", Paul Samuelson said in one of his papers.

The inertial or adaptive behaviour of economic processes and phenomena, and moreover of the budgeted revenues' (resources) evolution is presented in the specialty literature[640] with the help of forecast stochastic methods:

- **autoregressive methods** (AR) of order 1, AR(1), $y_t = a_0 + a_1 \times y_{t-1} + u_t$ of order 2, AR(2) $y_t = a_0 + a_1 \times y_{t-1} + u_t$, regard the distance in time of the past values of the variable which determines the present and the future level;

- **moving average models** (MA) of order 1, (MA(1)), $y_t = \bar{y} - b_1 \times u_{t-1} + u_t$ of order 2, (MA(2)), $y_t = \bar{y} - b_1 \times u_{t-1} - b_2 \times u_{t-2} + u_t$, regard the distance in time where the influence of the perturbation "is felt";

- **mixed models** (autoregressive and moving average) – ARMA (pq) representing a combination of both sources of growth:

$$y_t = \bar{y} + a_0 + a_1 \times y_{t-1} + a_2 \times y_{t-2} + \dots + a_p \times y_{t-p} - b_1 \times u_{t-1} - \dots - b_q \times u_{t-q} + u_t$$

- **autoregressive integrated moving average models** ARIMA (pdq) – representing a variant of the mixed models by which the existence of the trend within the series is specified, indicating by the size "d" the order of the difference which has brought stationary values. Usually, the 1st order differences among the terms of the series $dy_t = y_t - y_{t-1}$, at most the 2nd order differences, $d^2 y_t = y_t - dy_{t-1}$ manage to eliminate the trend in the data.

The statistical characterisation of the stochastic methods is made with the help of media, dispersion and covariance, an example being the autoregressive model in its simplest form:

$$y_t = a_0 + a_1 \times y_{t-1} + u_t$$

The average of the AR(1) process is:

$$M(y_t) = M(a_0 + a_1 \times y_{t-1} + u_t) = a_0 + a_1 \times My_t, \quad M(y_t) = \frac{a_0}{1 - a_1},$$

The dispersion of the y(t) process:

$$\sigma^2(y_t) = \sigma^2(a_1 \times y_{t-1} + u_t) = M[(a_1 \times y_{t-1} + u_t) - M(y_t)]^2 = a_1 \times \sigma^2 \times y_{t-1} + \sigma^2 u$$

Taking into account the fact that the process is stationary $\sigma^2 y_t = \sigma^2 y_{t-1}$, it results:

$$\sigma^2 y_t (1 - a_1) = \sigma^2 u$$

[640] *Eugen Ştefan Pecican – Econometrie pentru Economişti, Ed. Economică, Bucureşti, p. 137*

$$\sigma^2 y_t = \frac{\sigma^2 u}{1 - a_1}$$

The covariance of the y(t) process, in its turn, for the AR(1) autoregressive model is determined as such:

$$C_{OV}(y_t, y_{t-1}) = M[(y_t - M(y_t))(y_{t-1} - M(y_{t-1}))]$$

$$M[(a_1 y_{t-1} + u_{t-0})(y_{t-1-0})] = M(a_1 y_{t-1}^2 + u_t y_{t-1})$$

$$a_1 M(y_{t-1}^2) + M(u_t y_{t-1}) = a_1 M(y_{t-1}^2) = a_1 \sigma^2(y)$$

Because u_t and y_{t-1} are not correlated and $\sigma^2(y_t) = \sigma^2(y_{t-1})$

$$C_{OV}(y_t, y_{t-2}) = a_1^2 \sigma_{y_t}^2$$

$$C_{OV}(y_t, y_{t-k}) = a_1^k \sigma_{y_t}^2$$

Conclusions

Beyond the sobriety of the mathematical calculus made by the specialists in econometrics, the financial manager is interested in knowing the forecasting techniques in order to draw up the income and expenditure budget, the basis for the implementation of the economic-social development strategies of the local communities.

The financial management remains a fundamental component of the public management which through the theoretical-methodological arsenal that offers to the loan officer, helps to totally or partially solve the balance equation:

NEEDS FOR FINANCING   =   **SOURCES OF FINANCING**

(in continuous growth and diversification)   (with a limited character and under the pressure of diminution)

It remains to be seen to what extent the managers will use these levers capitalised by the science of management so that the public service users can fully feel the usefulness of the services that they benefited from.

BIBLIOGRAPHY

1. Fernham, D. - *New Public Managers in Europe*, Cambridge, ICSA, Publishing, 1996;
2. Pecican, S. - *Econometrie pentru economişti*, Ed. Economică, Bucureşti, 2004;
3. Moşteanu,T. (coord.) - *Buget şi Trezorerie Publică*, Ed. ASE, Bucureşti, 2003;
4. Vacarel, I. (coord.) - *Finanţe publice*, 3rd edition, Ed. Economică, Bucureşti, 2003.