

Application of Multiple Linear Regression Analysis of Employment through ALMP

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Abstract

In this paper it has been made a statistical overview and analysis of the impact of employment and active politics in the labor market in the Republic of Macedonia through the multiple regressions linear. As independent variables of the model we have chosen the annual costs incurred for the implementation of various programs active and inflation (the change in the consumer price level). The model dependent variable is employment (unemployment exit) for each of these programs.

The study is based on data from the Employment Agency and the State Bureau of Statistics Republic of Macedonia for the period 2008-2013.

Results of the research show that the increase in funding costs for some programs active policies would affect the increase of employment in the Republic of Macedonia.

For data processing is used *STATA*

Keywords: Employment, Unemployment; PATP; Linear Regression

Introduction

European assessment programs before 1994 are reviewed in Heckman studies et.al (1999) and later by Kluge and Schmidt (2002) as additional studies programs until 1999. The first evaluation studies are known as "first generation", it includes assessments of new policies for the time, applying econometric techniques on the new data. The other part is the "second generation" of European research policy evaluation and characterized by advanced and enhanced by a deep and methodologies developed faster, and often more accurate data. Other studies on the experience of ALMPs found in Martin (2000) and Martin and Grubb (2001), which provide a description of the experience of OECD countries with respect to active measures on the labor market. Heckman et al. (1999) presents an overview of microeconomic studies in U.S. and Europe. While U.S. researchers have begun evaluating studies almost the mid '70s, European efforts in this area began much later, at the same time with the recent launch of the full use of these policies. The authors of the study point out that there appears no clear pattern of performance of various active policy. In Europe, based on the initial assessment a number of studies, the authors "did not observe any pattern that leads them to

the conclusion that an active policy of labor market provides greater employment impact than a different policy". Kluge and Schmidt (2002) reviewed studies evaluating EU programs developed covering the period 1983-1999, especially during the 90s. From initial quantitative analysis (which includes studies reviewed to Heckman) they concluded that studies show ALMPs given the heterogeneity of their effects. These attitudes early, you added other studies estimate made in recent years in different European countries and recognized studies "third generation". Most come from the empirical microeconomic areas, considering the average treatment effects for individuals treated and neglected potential replacement and its effects. Compared with the large number of micro-studies, literature on the macroeconomic effects of ALMP is truncated.

Recent studies microeconomic differ in some respects than those starters. A number of programs have different goals and focus on different target groups. On the other hand moving from one place to another, the programs implemented in different economic levels regardless of specific institutional background. Given these features, we note that studies show different ways of evaluation and assessment techniques. Most of the studies are based on the non – eksperimental data. Given identification strategies, "third generation" of commonly used assessment programs or evaluators or compatible models long, with few exceptions. A part of the study focused on short-term effects, although some recent studies try to evaluate long-term effects. While some studies consider the effects on earnings of participants, most studies estimate the impact of participation in employment and unemployment as the main result.

Cost-benefit analysis on the effectiveness of labor market programs are scarce and found only a few evaluation studies.

Development of the "culture of proper assessment" has been positive in all European countries, although different countries find themselves at different stages of development. Important finding of these studies is that efforts should continue and expand assessment. Despite improvements in non-experimental evaluation of programs, most European governments concerned about the effectiveness of their policies, but would consider implementation of randomized trials, as the bulk of the evidence that they derive.

As stated above, the question naturally arises: What kind of evaluation to choose?

An evaluation for selection should take into account:

The type of data available or can be collected;

- Details of the implementation or operation of the program;
- Advantages and disadvantages relative to each assessment (cost, ease of calculation, reliability, etc..).
- Data collection, sample size and geographic coverage (rural / urban);
- Selection of the sample (as admission of ALMPs usually conditional upon registration at employment offices, the registry can be used as a framework);

In support of the objectives of the study, the realization of this research has been aimed at meeting these specific objectives:

1. Identify the impact of active labor market
2. Comparison of different active programs implemented in Macedonia
3. Determining the effect of each program in the job market

1. Research Methodology

To meet the objectives of the research work was focused on the literature review regarding the evaluation of active programs in Europe by various researchers.

In realization of this research were used secondary data. These data were obtained from various institutions as an Employment Agency and the State Bureau of Statistics. Selection of statistical data on employment programs that were taken in the study cover the period from 2008 to 2012. In this period of active programs were selected that had a longer time span in the labor market.

Was specifically selected:

- "Program to encourage employment of unemployed "Because within this program is under different programs with duration of treatment of the unemployed have analyzed them separately as:

"Program promoting employment of unemployed workers through self-employment, subsidies, encouraging the formalization of existing businesses, through surveys and training for new jobs"

Other programs were not taken into consideration because the timing of their implementation was relatively short.

To determine the effectiveness of the programs we used quantitative analysis of statistical data by building regression models.

For selecting the variables of the model relied on macroeconomic assessment establishes a relationship between the econometric main macro aggregates (unemployment, employment, GDP, inflation and various dimensions of the size of Active Policy.

Testing regression model was made with SPSS 17 program, using a Guide for Research and Doctoral company Minimax Consulting.LLC December 2008)

2. The research hypotheses

Research hypotheses are a logical continuation of the study hypothesis and answer the questions focus on primary research "programs have different effects different active labor market?"

Various scholars in their research are trying to explain the impact of programs active in the labor market. Heckman et. al. (1999) concluded that training and employment programs dictated by the government, have different impacts on different demographic groups and affect more people with disabilities. Kluge and Schmidt (2002) supported the above conclusion concluding that training programs are likely to improve the future labor market. Moreover, the direct creation of jobs in the public sector has had little success, while subsidies to the private sector show some positive effects. (Boone and van Ours 2004) in their macroeconomic assessments concluded that there is a positive relationship between spending on employment policies and labor market effects.

Given the fact that in Macedonia, active programs are growing more and more based on the number of studies in this area arose following assumptions. H_1 : Program to encourage employment of unemployed has a positive impact on labor market performance, increased spending in this program will increase the probability of employment.

3. Building Regression Model

To analyze the impact that can have different active programs on employment levels built a multiple regression model. Building this model took into account the research literature by

adjusting the market opportunities offered vëndas.Si independent variables of the model we have chosen the annual costs incurred for the implementation of various programs active and inflation (the change in the consumer price level). the model dependent variable is employment (unemployment exit) for each of these programs.

Equation 1

Employment = f (cost for each program, Inflation)

The conceptual model presents the regression equations 2.

Equation 2

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon_i$$

$$H_0 : \beta_1 = 0, \beta_2 = 0$$

$$H_a : \text{At least one of the } \beta \neq 0 \quad \alpha = 0.05$$

4. Analyses of variables

Before you build the model of the determinants of employment is necessary to make an analysis of the variables.

One of the problems associated with the evaluation of equation 2 is that if unemployment rises Property Policy costs are also likely to increase (Boone and van Ours, 2004). To normalize this, the costs of different types of active programs are geared to cost / per worker GDP percentage of the unemployed / work force.

$$X = \frac{\frac{PATP}{P}}{\frac{GDP}{N}} = \frac{\frac{PATP}{GDP}}{\frac{PF}{FP}} = \frac{patp\%}{pf}$$

Where: ALMP - total annual expenditures for various programs active in mil / den.

P - Number of total annual unemployment.

GDP - Gross domestic product in the mil / den

N - The population of the country.

F - Number of workforce.

patp - Costs for each program as % of GDP.

p - The ratio of unemployment to labor force.

f - The rate of labor force participation

Rate of inflation, we have included in the model to increase the level of employment explaining variation of independent variables in the model.

To determine the sign of the expected impact hypothesis will examine how changing variables determining the level of employment (unemployment exit).

Thus, in terms of:

- *Spending adjusted for each program thought that the more higher the indicator, the more greater will be the number of employees from the respective program, then the expected sign of this indicator is expected to be positive.*

- *Inflation as big as this indicator (increase of prices, wages), the greater the level of employment in the country so the expected sign of this indicator is expected to be positive.*

➤ **Interpretation of the results of the model**

➤ For self-testing program shows that:

All coefficients have Significance partially because the calculated t statistics is higher than the critical value. Therefore rejected the null hypothesis and it parnohet alternative, which states that have reliability coefficients. In addition to this general pattern has since Significance F statistic calculated is higher than the critical value. The coefficient of determination $R^2 = 0.85$ is very high and indicates that the variables of the model explain independent body of over 85%. We can conclude that the calculation of variables and model specification is well specified.

As the result of regression can konstatatojme that this policy has contributed to over 92% in the employment of the labor force envisaged in government policy. If the costs of this program for 1% plateau will affect employment growth 0.92%, ($\beta_1 = 0.92$). The coefficient of inflation is expected according to the theory of the business cycle (macroeconomic perspective) as growth beyond 1% inflation will affect employment increase of 0.15%, ($\beta_2 = 0.15$), however, our focus is the employment policy where can conclude that the program is efficient and suggest the government to recommend the continuation of such policies to reduce unemployment.

➤ For testing program shows that subsidy:

All coefficients are partially Significance, in addition to inflation because the calculated statistics is higher than the critical value. Therefore hypothesized zero and she accepted alternative, which states that have reliability coefficients. In addition to this general pattern has since Significance of F statistics calculated is higher than the critical value. The coefficient of determination $R^2 = 0.98$ is very high and indicates that the variables of the model explain independent body of over 98%. We can conclude that the calculation of variables and model specification is well specified.

Regarding the result of regression can konstatatojme that this policy has led to over 100% in the employment of the labor force ee provided in government policy. If the costs of the program must be reared to 1% will affect employment increase of 1.01%. ($B_1 = 1.01$) rate of inflation and does not interpret Significance.

To formalize existing business program testing shows:

All coefficients have Significance partially because the calculated t statistics is higher than the critical value. Therefore hypothesized zero and she accepted alternative, which states that have reliability coefficients. In addition to this general pattern has since Significance of F statistics calculated is higher than the critical value. The coefficient of determination $R^2 = 0.99$ is very high and indicates that the variables of the model explain independent body of over 99%. Can conclude that the calculation of variables and model specification is well specified.

As the result of regression can konstatatojmë that this policy has led to 99% in the employment of the labor force envisaged in government policy. By increasing spending to 1% programi this will affect the reduction of unemployment to 1:09%, ($\beta_1 = 1:09$). The coefficient of inflation is expected conform the business cycle theory (macro perspective) as growth beyond 1% inflation will affect employment increase of 0.02%, ($\beta_2 = .02$). But our focus is the employment policy which can conclude that the program is efficient and suggest / recommend the government to continue such policies to reduce unemployment.

➤ For the survey program of new work shows testing:

All coefficients are partially Significance for t statistics calculated is higher than the critical value. Zero and therefore hypothesized that parnohet alternative, which states that have reliability coefficients. In addition to the general model has since Significance F statistic calculated is higher than the critical value. The coefficient of determination $R^2 = 0.99$ is very

high and indicates that the variables of the model explain independent body of over 99%. We can conclude that the calculation of variables and model specification is well specified.

As the result of regression can konstatatojme whether the costs of the program must be reared for 1% will contribute to reducing unemployment to 1.15%, ($\beta_1 = 1.15$) rate of inflation is expected according to the theory of the business cycle (macroeconomic terms) since inflation Increase by 1% would result in the reduction of employment to 0.033%. ($\beta_2 = 0.033$)

The incentive program for the employment of unemployed through training testing shows: All coefficients are partially Significance, in addition to inflation because the calculated statistics is higher than the critical value. Therefore hypothesized zero and she accepted alternative, which states that have reliability coefficients. In addition to this general pattern has since Significance F statistic calculated is higher than the critical value.

The coefficient of determination $R^2 = 0.98$ is very high and indicates that the variables of the model explain independent body of over 98%. Can conclude that the calculation of variables and specification of the model is well specified.

As the result of regression can konstatatojme that this policy has contributed to over 95% in the employment of the labor force envisaged in government policy. If the costs of the program must be reared for 1% will affect employment increase of 0.95% ($\beta_1 = 0.95$). Inflation coefficient Significance and does not interpret.

5. Conclusions model

The analysis of the model these important conclusions emerge:

Active-employment programs have a significant impact on employment levels.

-N.q.s. compare the impact of each program on employment, employment promotion program of unemployed has greater influence on the level of employment that employment promotion program of unemployed workers through job training).

Comparison of sub-programs within shows through subsidies and training programs have greater impact on employment.

One limitation of the model is the lack of observations in longer periods of time so that the number of observations exceed several times the number of variables in the model.

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