MODELS OF DEVELOPMENT OF LABOUR PRODUCTIVITY FORECAST

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Abstract

Labor productivity is an associate human resources employed by employees. Of course the results achieved in national economies are contributing both the number of employees, but at the same time and efficiency with which they work. A synthetic, we estimate that labor productivity, or efficiency with which resources are used for work, the efficiency factor with the use of capital (fixed assets) in achieving national economic growth. Labor productivity can be studied using the model of the input fields using labor productivity forecasting by extrapolation, by means of international comparisons, or through economy labor relative concretely realized as a result of the uses of labor resources. The authors focused on relations mathematical calculation, they underpinning the forecasts of labor productivity. Productivity gains should not be dissociated from the factor labor resources as labor resources should be used more efficiently, but at the same time, the economy put the issue to make as many jobs by investing an important role taking it FDI and domestic capital use. ISAAA so in this article, the authors seek and fail to provide essential elements posed forecast labor productivity.

Keywords: productivity, growth rate, capital, efficiency, interdependence

Introduction

The study required macroeconomic forecasting an important role is played by the study of labor productivity. Labor productivity is the quality factor against which results can be positively striven, but always bear in mind how to associate resource labor capital employed, especially of resources financial and material resources available to the economy. Based on Cobb-Douglas production function we find that in addition to forecast human resources required to complete a major study and on models developed to
forecast labor productivity for the study associated the increased number of employees and labor productivity growth to identify the trend which will follow the macroeconomic indicators of results. The focus is on forecasting labor productivity by extrapolation, which is nothing but the ability to switch from actual results known at a time and using statistical quantities such as the average index of evolution, to identify extrapolation steps you can following economic growth of a country. It also makes a study of international comparisons and the method to be used to forecast labor productivity by determining the time required to close the gap Romanian economy to more countries and more concretely developed. Will be used in this case precise relationships that through the study of them will give a precise tint in connection with forecast labor productivity. Finally, the authors focus on the presentation forecasting the economy relative labor productivity through labor. Thus it identifies the main steps to be followed by one who wishes to make a forecast effective, practical and useful decisions by studying macroeconomic forecast labor productivity.

**Literature review**


**Research methodology and data**

In preparing the forecast of labor, it is necessary to anticipate in advance labor productivity for the period ahead.

Forecasting labor productivity can be achieved resorting to various methods: by extension, by international comparisons, the correlation with the degree of endowment of labor and efficiency using production equipment (fixed assets) through relative economy of labor, using the model of the input branches (BLR).

Extrapolation forecasting labor productivity can be realized either by a single factor (single factor model) considered several issues:

\[
W = a + b + x
\]

\[
W = a + b \times x + c \times x^2
\]

\[
W = e^{a+b\times x+c\times x^2}
\]

either on account simultaneous influence of several factors (multifactor models), respectively:

\[
W_i = a + b \times x + c \times x_2 + d \times x_3 + \ldots + z \times x_n
\]

\[
x_i = a \times x_1^{b_1} \times x_2^{b_2} \times x_3^{b_3} \times \ldots \times x_n^{b_n}
\]

where:

- \( W \) = labour productivity;
- \( a,b,...,n \) = range (number of units of time) of statistical recording times labour productivity;
- \( x_i \) = factors of influence.

Method international comparisons can be used to forecast labor productivity by determining the time required to close the gap to a more developed country.

To address this issue will be used notations:

- \( t \) = the number of years needed for equalization levels;
- \( W_0(A) \) = labour productivity in country „A” beneficiary forecast in the base year;
- \( W_0(B) \) = labour productivity in more developed country „B” with which it is compared to the base year;
\[ r_W(A) \text{ and } r_W(B) = \text{average annual labor productivity growth in the two countries. Have achieved equality:} \]

\[ \ln W_0(A) [1 + r_w^r(A)]^t = W_0(B) [1 + r_w^r(B)]^t \]

\[ \ln W_0(A) + t \ln[1 + r_w^r(A)] = \ln W_0(B) + t \ln[1 + r_w^r(B)] \]

where from:

\[ t = \frac{\ln W_0(B) - \ln W_0(A)}{\ln[1 + r_w^r(A)] - \ln[1 + r_w^r(B)]} \]

Forecasting average annual rate of labour productivity need country „A” to catch up with the country „B” after „t” years (considering the time) will use the relationships below:

\[ \ln[1 + r_w^r(A)] = \frac{\ln W_0(B) - \ln W_0(A)}{t} + \ln[1 + r_w^r(B)] \]

\[ 1 + r_w^r(A) = e^k \Rightarrow r_w^r(A) = 1 + r_w^r(A) - 1 \]

with:

\[ k = \ln[1 + r_w^r(A)] \]

Then it can design the absolute volume of labor productivity for the country „A”:

\[ W_t(A) = W_0(A) \times [1 + r_n(A)] \]

Labor productivity forecasting can be carried out and correlated with the availability of equipment and labor usage efficiency of production equipment, using the model of the following form:

\[ \Delta W_x = \alpha \times \Delta x + \beta \times x \times \Delta x \]

\[ \Delta W_y = \beta_y + \alpha_y \times \Delta y \]

\[ \Delta w = \Delta w_x + \Delta w_y \]

\[ w_t = w_0 \times (1 + \Delta w)^t \]

where:

\[ x = \text{index degree of technical endowment of labor (fixed assets lei per person) in the base year;} \]

\[ y = \text{overall efficiency index of technical equipment (fixed assets) in the base year (the output from a unit of fixed assets);} \]

\[ \Delta x, \Delta y = \text{average annual increases for these indices;} \]

\[ \Delta W_x = \text{part of the increase in labour productivity due to increased labor endowment;} \]
ΔW = Part of the increase in labor productivity due to increased efficiency of fixed assets; 
α = parameter adjustment of the influence factors on „x” and „y”, located between 0 and 1; 
β = 1-α (when α=0, the influence of the „x”, „y”, factor returns, and when α = 1 is obtained on behalf of the influence factor „y”); 
t = forecast horizon.

Forecasting labor productivity through labor relative economy is achieved in stages, as follows:
- preliminary production level for the base year (X₀);
- preliminary labor staff base year (L₀);
- calculating labor productivity for the base year of relationship:
  \[ W₀ = \frac{X₀}{L₀} \]
- determination of volume of production in the year of forecasting (Xₜ);
- calculation of the labour requirements in production in the forecast year, but labour productivity in the base year:
  \[ L^* = \frac{Xₜ}{W₀} \]
- calculation of the relative size of the economies of labor based on predetermined factors of growth of labour productivity using the relationship:
  \[ \sum ΔL = ΔL₁ + ΔL₂ + \cdots + ΔLₙ \]
- calculating labour requirements for the forecast year:
  \[ Lₜ = L^* - \sum ΔL \]
- determining the level of labour productivity for the year forecast:
  \[ Wₜ = \frac{Xₜ}{Lₜ} \]
- the establishment of labour productivity growth for the estimated interval:
  \[ W = Wₜ - W₀ \]
- determination of the increase in the productivity of the expected range:
\[ I_w = \left( \frac{W_t}{W_0} \times 100 \right) - 100 \]

- determining the contribution to labor productivity growth to increase production in this way the Gross Domestic Product.

\[ L_{x/w} = \frac{(l_x^% - l_x^%)}{(l_x^{100} - 100)} \]

From the above it can conclude that forecast labor productivity is important because this indicator (labor productivity) is the quality factor of increasing economic performance. Using relations (models) presented above can provide a realistic forecast of the evolution of the qualitative growth of labor productivity.

**Conclusions**

Article presented based on the study conducted by authors drawn conclusions about how labor productivity has a very important role in relation to economic growth. Weather human resources must be supplemented by forecast labor productivity to pursue correlated effect they have two variables, employment and labor productivity on capital macroeconomic indicators, primarily gross domestic product in this way and GDP per capita. By the way authors have addressed these issues gradually broke away main models that can forecast development based on labor productivity growth. The authors searched and managed to identify the main development models to forecast labor productivity establishing links between branches utility balance in this study, widening then able to forecast labor productivity by extension, on behalf of a single factor that labor productivity. It is suggested using simple linear regression perspective that gives consistent effect of increasing labor productivity, and increase the value of macroeconomic indicators. It can go in depth, and this correlation is extended using a multifactor econometric model that associates the importance it has increased the number of employees, so the use of labor resources and labor productivity growth. The authors highlight the fact that labor productivity is the factor that ensures the possibility of increasing quality in terms of growth, macroeconomic indicators. We pay attention to international comparisons method based on the fact that this study is determined decallajele which places Romania of the other countries with developed economy and suggests possibilities for action by macroeconomic decisions taken on reducing these gaps. Finally, on forecasting labor productivity through relative economy of labor, the authors present a model
structured in several stages, highlighting how the researcher must address specifically and synthetic how to analyze this aspect of labor productivity developments. Finally stresses that this article valence theory mainly, but identifying and putting into the equation modelelele usable suggests the possibility to make and deepen the analysis, using data at a time where to go to establish forecasts by extrapolations for future stages.

References


