Measuring the Effect of Minimum Wage on Employment (Approach of Engineering Economics)

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Abstract-The discussion in basis of determining the minimum wage relates to different perspectives, in which we could refer to the perspectives such as determining the minimum wage, the relation of minimum wage with labor productivity, the effects of minimum wage on poverty reduction and improvement in wage distribution, and finally the effects of minimum wage on employment in different age groups and gender would be observed in this research. The effects of wage on employment in Iran has been studied in present research, and 10 provinces were chosen for this, and also the research has been accomplished with Hausman and Levin-Lin-Chu test.The results of this research showed that the factors such as minimum wage, unemployment rate, goods price index and consumption services have all negative and significant relation with dependent variable .In contrast, Gross domestic product has positive and significant relation with employment.

Keywords- consumption, employment, labor productivity, minimum wage

I. INTRODUCTION

In base of minimum wage in regions, we could mention that Regional approach could be applied in various forms .At first, a distinct minimum wage would be determined for each region, and then a reasonable national wage with a minimum amount would be determined. Due to provide a minimum level of life, the experts in this field argue about the policy for determining the regional minimum wage. Surely we have to notice that the matter immigration" in Iran labor force from regions with lower wages to regions with higher wages is a limited factor, in which the immigration could be accounted a negative matter, and this is Due to some reasons such as population density, problems about housing, health services, and etc. .on the other side, "immigration" in labor force with high productivity involving higher wages could be lead to the decrease of productivity in developed regions. Some argue that by increasing the minimum wage, however, the economy will be adversely affected due to small businesses not being able to keep up with the need to subsequently increase all workers' wages, so it would also become a challenge in regions. The most important index to make the wages balanced is the consumption price index. A consumer price index measures changes in the price level of consumer goods and services purchased by households. The consumer price index is a

statistical estimate constructed using the prices of a sample of representative items whose prices are collected periodically. Sub-indexes and sub-indexes are computed for different categories and sub-categories of goods and services, being combined to produce the overall index with weights reflecting their shares in the total of the consumer expenditures covered by the index. It is one of several price indices calculated by most national statistical agencies. The annual percentage change in a consumer price index is used as a measure of inflation .A consumer price index can be used to index , adjust for the effect of inflation, the real value of wages, salaries, pensions , for regulating prices and for deflating monetary magnitudes to show changes in real values . In 1991, Stephen Bazen and Jon Martin presented a paper, in which they perused the effects of minimum wage on income and employment in French people .The purpose to submit this paper was to find empirical evidences about the effect of wage on labor force market in adults. To peruse the effects of mentioned factors, authors announced the followings, in which the wage imbalance has to be estimated through considering the minimum wage, and labor demand has to be considered with an appropriate wage, and finally the effect of changes in minimum wage on employment has to be estimated with the obtained results from the previous evidences .We have to notice that traditional theory in labor force is not accepted, and we have to use new theory of labor force. The obtained results from mentioned estimations show that the changes in minimum wage have not put any effect on employment rate among French adult's labor force, however the studies showed that the results were vice-versa. Also, the obtained results about the effects of wage on wage average showed that the minimum wage could increase the wage average in significant level. Higher demand for goods in case of increase in products price, would decrease the productions, and the decrease in productions would decrease the employment rate as well. Thus higher productions would increase the labor force. Surely along these issues, we have to mention the work force and succession planning guide; this fact shows that some groups in work force could be substitute with other groups that this matter has to be considered in policy of determining minimum wage. Also, the share of work force from production rate has to be considered. This share may not be high in the industries with minimum wage, and the significant effectiveness may not be effective in employment. International Labor Organization has announced that the minimum wage policy has the negative effect on

female 's employment and young employee , that this matter is relevant with theory expectations , but some studies in particular periods of time has shown that the increase of wage rate has not put the effect on employment in 1969-1996 .slope of demand curve has not be recommended always , meaning that how much prices increase , demand decreases , also the other reason would be the number of work force whom the minimum wage policy is not belonged to them . In this case, however the total percentage of employment does not change, but it may be subsequently changed. Here the other reason would be the matter in which the policy for determining the minimum wage in work force could be specified in long duration, thus this policy may be specified in a long duration.

This research is prepared to show that the increase in determining the minimum wage could be effective to reduce the poverty through organizations. Also, this policy could reduce the relative poverty, that this could improve the laborer's life situation having low income. This research could be used in social security organization, labor ministry and social affairs, in which the best results could be obtained. In this research, following factors have been considered as well:

To specify the approaches to determine the minimum wage in Iran and all around the world analysis and observation of the minimum wage effects on employment Present research is a research accomplished with descriptive, empirical and validate method. Post reviewing the theoretical bases of study, the empirical studies have been also accomplished, in which theoretical basis of model in present research has been observed, and we would estimate the increase in wage through the minimum wage and panel data. Then the effect of changes in minimum wage would be estimated through applying them on employees .particularly we use the panel data to estimate equations. To estimate the regression models, E-Views software has been used in this research. Research methodology could be summarized as following:

-In justifying chapters and codifying texts, comparative method based on academic argumentation has to be used

- Comparative method has to be used in observations of theories and outlooks

-Observation of research subject, literatures and studies by economists is accomplished through library method

- In this research, the tools for data collection is the central information banks and Iran's statistics center, or the statistic and information coming from statistic center. On the other side, the other formal centers are as following:

 -Minimum wage data: compensation unit

-Goods price indices and consumption services: Iran's Islamic republic central bank

- Gross domestic product and employment, unemployment, population, and the average of wages; Iran's statistic center

-Categorizing provinces based on obtained data has been accomplished through Iran's statistic center, which this turns back to 1991-2009.

Statistical society is a set of elements having one common characteristic. As observed from the title of research, this research is actually a case study accomplished in Iran. Hence, Statistical society could not be specified meticulously. on the other side, due to the point that estimations could be accomplished through observing variables, so we considered some provinces as statistical society , which these provinces are such as Isfahan , boushehr, western Azerbaijan, Kermanshah, Hormozgan, Sistan and Baluchestan, Kerman and Mazandaran, in which adequate data were available for the statistical society in this research.

The stages to accomplish the research consider the Regression model through panel data as following, in equation 1:

$$Y_{i\text{-}t} = B_{i\text{-}1} + B_2 \, x_{i,t} + \varepsilon_{i,t} \tag{1}$$

In above relation, i shows the ith sectional unit, and t shows the tth time period, it is assumed that the maximum sectional unit is N and the maximum time period is T.The estimation of model 1 depends on the assumption relating to slope coefficients, error percentage, and origin width .Two general cases to estimate equation 1 is as following:

A-we assume that origin width and slope coefficients are constant in time and place length, whereas we assume that the standard error is different in a period of time and for different people.

B- The slope coefficients are constant, whereas the origin width is different for different individuals. The simplest method is omitting the place, time and combined data dimensions; regression estimation, in this case would be as following, in equation 2:

$$Y_{i,t} = B_1 + B_{1.x} + \varepsilon_{i.x} \tag{2}$$

As observed in origin width estimation, the slope coefficients would be same in all sections. Estimation of equation 2 accomplishing with the method of ordinary least squares, well-known with least panel squares method. The other method is to consider sectional units in a single form, panel regression equation could be shown as following through assuming the slope coefficients constant between sections, equation 3:

$$Y_{i,t} = B_{1,i} \, x_{i,t} + \varepsilon_{i,t} \tag{3}$$

In equation 3,i index in origin width shows that origin widths could be different in different sections. The difference may be due to particular characteristics in each of sections. In econometric, equation 3 is well known with constant effects in regression model or ordinary least squares.

The basic argumentation in model's constant effects is the point that appropriate variables have not **entered** in regression model specification. Initial base begins with equation 2, in which the equation 3 is preferred to be used instead of equation 2, and the randomized variable has the $B_{1,i}$ average , and origin width could be specified as following for each single section.

$$B_{1,i} = B_1 + \varepsilon_i \tag{4}$$

In equation 4, ε_I is random error standard with zero average and δ^2 variance, and estimation would be possible to do with different slope and origin.

II. MAIN BODY

Approaches to determine the minimum wages in the world: In present research, the purposes about minimum wage in different countries have been approved. In 1884, New Zealand in Australia was from the first countries in which serious enactment about determining minimum wage was accomplished, then in some European countries, some rules were presented to support employees in country. We have to notice that the minimum wage was determined for only a certain group of employees in the country, for example , in Canada and U.S , the minimum wage was determined only for women, children and workers. Other countries which the minimum wage was determined in certain groups were France (1915), Austeria (1918), Germany (1923), Spain1926), Belgium (1934). In Asian countries, the regulations about determining the minimum wage were different, and the policy to determine the minimum wage was not extensive in these countries. The Philippines is from the countries which used the policy of determining minimum wage more than other countries. Also, we have to mention that the countries in West part of Asia such as Iran, Lebanon, Afghanistan, Syria, Turkey and Iraq use this policy more than other Asian counties. Specifically, the policy to determine the minimum wage could be used in all the countries which are member of this organization in economic, development and cooperation parts. In Portugal, the policy of minimum wage has been determined through government, this regulation is not belonged to disabled employees, these employees could use the other regulations in their country. In Portugal, this policy is belonged to employees who are under 18 years old, and %75 of total amount belongs to this group. The amount of minimum wage is annually changing with triangular cooperation, economic performance, and inflation. In New Zealand, the policy of minimum wage is determined through government, this policy is not belonged to trainees, and %60 of total amount belongs to this group. In New Zealand, based on the index of prices wage there is no way to balance the minimum wage in each year .we have to notice that Italian and federal regulations could determine various activities to enact the policy of minimum wage, for example the regulations in Menioso nation does not consider some groups in this policy, which these groups are actually farmers, staffs, sellers, and etc. The employers who annually have less than 500000 $ are the one who take advantages from minimum wage policy.

One of the important issues in making the policy of minimum wage is to make this amount balanced with the changes in other economic indices. As stated, frequently the minimum wage would be determined in order to provide a family's life earnings in consumption pattern. Frequently economic, social and cultural conditions are all used to measure the consumption price index. in Iran , it is possible to measure the minimum wage in all different age groups ; also it would be clear that social aims could be totally estimated in making the policy of minimum wage in competitive economic field .The indices in which the minimum wage is balanced, are actually the measurements based on the minimum wage to determine the wage average , which these are the purposes of determining minimum wage to improve the wage average and reduce the wage curve .The policy to determine minimum wage has been emerged from many years ago , and it is still applicable ; surely some changes in approaches to determine minimum wage in Iran show the fundamental changes in this policy .These fundamental changes from the perspective of minimum wage impact on Iran 's work force were effective to determine minimum wage .Also , the ratio of minimum wage to other important indices such as life cost , real growth rate of minimum wage, and productivity have been all analyzed . Among the indicators that might be used to establish an initial minimum wage rate are ones that minimize the loss of jobs while preserving international competitiveness. general economic conditions are measured by real and nominal gross domestic product; inflation; labor supply and demand; wage levels, distribution and differentials; employment terms; productivity growth; labor costs; business operating costs; the number and trend of bankruptcies; economic freedom rankings; standards of living and the prevailing average wage rate. In the business sector, concerns include the expected increased cost of doing business, threats to profitability, rising levels of unemployment and the possible knock-on effects to the wages of more experienced workers who might already be earning the new statutory minimum wage, or slightly more

Supporters of the minimum wage say that it increases the standard of living of workers, reduces poverty, and forces businesses to be more efficient. Opponents say that if it is high enough to be effective, it increases unemployment, particularly among workers with very low productivity due to inexperience or handicap, thereby harming less skilled workers and possibly excluding some groups from the labor market; additionally it is less effective and more damaging to businesses than other methods of reducing poverty.

Theoretical base in relation with minimum wage and employment:

According to obtained studies, if wages through the regulation of minimum wage increase from the balanced level to an upper level in market, so employment opportunities would be decreased in this case .This matter could be due to some dynamic activities in work force. In dynamic models of work force, assuming that the effects of minimum wage on family's earning have positive effect, thus above hypothesis would not be accurate. To announce different theories about above hypothesis, some economic theories about the relation between minimum wage and employment have been considered in following;

III. CLASSICAL THEORY

Classical or real-wage unemployment occurs when real wages for a job are set above the market-clearing level, causing the number of job-seekers to exceed the number of vacancies .Many economists have argued that unemployment increases the more the government intervenes into the economy to try to improve the conditions of those without jobs. For example,

minimum wage laws raise the cost of laborers with few skills to above the market equilibrium, resulting in people who wish to work at the going rate but cannot as wage enforced is greater than their value as workers becoming unemployed. Laws restricting layoffs made businesses less likely to hire in the first place, as hiring becomes more risky, leaving many young people unemployed and unable to find work. However, this argument is criticized for ignoring numerous external factors and overly simplifying the relationship between wage rates and unemployment. In other words, those other factors may also affect unemployment. Some economists suggest that even social taboos can prevent wages from falling to the market clearing level. It should be noted that market equilibrium is not without its consequences and compromises.

IV. KEYNESIAN THEORY

Prior to Keynesian theory ,the economy existed in a state of general equilibrium, meaning that the economy naturally consumes whatever it produces because the needs of consumers are always greater than the capacity of the economy to satisfy those needs. This perception rests upon the assumption that if a surplus of goods or services exists, they would naturally fall in price to the point where they would be consumed.

Keynesian Theory was significant because it overturned the mainstream thought of the time and brought about a greater awareness that problems such as unemployment are not a product of laziness, but the result of a structural inadequacy in the economic system. It is argued that because there was no guarantee that the goods that individuals produce would be met with demand, unemployment was a natural consequence. the economy is seen unable to maintain itself at full employment ,and it is believed that it was necessary for the government to step in and put under-utilized savings to work through government spending. Thus, according to Keynesian theory, some individually-rational microeconomic-level actions such as not investing savings in the goods and services produced by the economy, if taken collectively by a large proportion of individuals and firms, can lead to outcomes, wherein the economy operates below its potential output and growth rate.

V. NEOCLASSICAL THEORY

Standard neoclassical theory models the labor market using the same broad conceptual framework as in the case of most other markets, with an upward-sloping labor supply curve and downward-sloping labor demand curve. A minimum wage is a price floor in the labor market, and in our standard model it should act like any other price floor. If it is set below the equilibrium point, it will have no effect, since the equilibrium wage will be above the minimum wage level regardless of whether minimum wage legislation exists. On the other hand, if the minimum wage is set above the labor market equilibrium, then it will have the desired effect, it will prevent wages being driven down below a certain value by market pressures. Thus, in the absence of special conditions, neoclassical theory predicts that an effective minimum wage will cause some

degree of unemployment. The precise magnitude of this negative effect on employment is of course a matter of debate, and is likely to vary depending on time, place, and the type of job under discussion. In terms of policy, it may or may not be considered an acceptable tradeoff for the beneficial effects of the minimum wage. There are, however, certain special circumstances in which this tradeoff does not exist at all, because the nature of the market is different from the standard model in such a way that a minimum wage will not produce unemployment.

In Neoclassical theory, paying workers a wage above equilibrium will in some way cause firms to need more workers. That could happen if the minimum wage increases the demand for the firms' products, leading them to expand and hire additional employees. For example, if a firm's employees are also its main customers, increasing their wages may induce them to buy more from the firm. If this effect is large enough to offset the costs of the higher wages, employment will not decrease, and it may even increase.

VI. NEO-KEYNESIAN THEORY

In Neo-Keynesian theory, Some theories such as Real Business Cycle explain the business cycle by attempting to explain the volatility in employment and real output. They use competitive models that exhibit volatility and quantities and prices are market clearing. Thus in these models the notion of unemployment has no role. There is no such thing as involuntary unemployment. It is thought that this approach is a credible way to approach thinking about the economy, whereas Keynesians theory is against this. When Keynesians explain the business cycle accounting for unemployment that reoccurs throughout the business cycle, then we could say that the models with clearing markets are of no use to this approach. As a matter of social science, the issue of whether to focus theoretically on unemployment or to focus on other features of business cycles and hope to learn something about unemployment as a by-product is one of research strategy, neither point of view being usefully enough developed at this point to have proved the other inferior.

VII. CONCLUSION (AN ENGINEERING ECONOMICS APPROACH)

Employment is a Dependent variable of stagnation; in the researches based on panel data, stagnation tests are the most important tests to estimate a regression with reliable coefficients. To determine stagnation of these data, there are different tests.

A. *study the stagnation of Explanatory variable , LEARN;*

For the Explanatory variable, LEARN, we have to apply stagnation test with software E-views 7, then in this test two hypotheses H_0 , H_1 would be considered to study the stagnation in mentioned variable .

For all i_s , $H_0 : p_i = 1$

At least for one of the i_s, $H_1 : p_i < 1$

TABLE I.

	Statistic	Prob
Levin-Lin-Chu test	-5.777	0.0000

The results of this test for annual earning variable show that this variable is significant at %100 assurance level , and has not unique root .(the results of first appendix estimation)

B. study the stagnation of L (CPI) variable (index of goods price and consumption services)

Two following hypotheses are announced to study the stagnation of Explanatory variable in consumption price index (CPI):

For all i_s, $H_0 : p_i = 1$

At least for one of the i_s, $H_1: p_i < 1$

TABLE II.

	Statistic	Prob
Levin-Lin-Chu test	-3.2111	0.0007

The results of this estimation show that this variable is significant at %100 assurance level , and the variable of consumption price index (CPI) does not have unique root .(the results of second appendix estimation)

C. Study the stagnation of L (GDP) variable (Gross domestic product)

Two following hypotheses are announced to study the unique root of Explanatory variable, gross domestic product:

For all i_s, $H_0: p_i = 1$

At least for one of the i_s, $H_1: p_i < 1$

TABLE III.

	Statistic	Prob
Levin-Lin-Chu test	-6.2447	0.0000

The results of this estimation show that this variable is significant at %100 assurance level , and the variable of gross domestic product index does not have unique root , thus H_1 hypothesis would be accepted , whereas H_0 hypothesis would be rejected (the results of second appendix estimation)

D. Study the stagnation of L (MW) variable, dependant variable

The following hypothesis is announced to study the unique root of Explanatory variable, minimum wage:

For all i_s, $H_0: p_i = 1$

At least for one of the i_s, $H_1: p_i < 1$

TABLE IV.

	Statistic	Prob
Levin-Lin-Chu test	0.3701	0.6444

The results of this estimation show that this variable, minimum wage variable, is not significant and has unique root (the results of fourth appendix estimation)

E. Interpretation of results in Tehran (Capital of Iran)

1- Origin width is %23 in Tehran, which this shows that the beginning point in Tehran city's diagram is started from a point upper than the origin width. This matter relates to other effective factors which are not mentioned in this model. We have to mention that these factors are different in different provinces, as a result different origin widths would be observed in this case.

2- Log (CPI) coefficient is 0.0009, which this shows the point that by increase of each unit in logarithm of consumption price indices, employment logarithm for nearly 0.0009 would be decreased.

3- Log L (EARN) coefficient is 0.0001, which this shows the point that by increase of each unit in logarithm of annual earning, employment logarithm for nearly 0.001 would be decreased. Also, this estimation has negative effect on employment variable.

4- Log (GDP) coefficient is 0.004, which this shows the point that by increase of each unit in logarithm of Gross domestic product, employment logarithm for nearly 0.004 would be decreased. This estimation has a positive and direct effect on employment.

5- Log (MW) coefficient is 0.001, which this shows the point that by increase of each unit in logarithm of minimum wage, employment logarithm for nearly 0.001 would be decreased.

6- Log (pop) coefficient is 0.03, which this shows the point that by increase of each unit in logarithm of population, employment logarithm for nearly 0.03 would be decreased.

7- Log (UI) coefficient is 0.158, which this shows the point that by increase of each unit in logarithm of unemployment, employment logarithm for nearly 0.158 would be decreased. This estimation has a negative effect on employment.

F. Interpretation of results in Fars

1- Origin width is -0.009 in Fars, and as explained in Tehran's interpretation of results, this is due to other effective factors which are not mentioned in this model. Also, the sign of origin width is negative which this shows that diagram starts from the downward of diagram.

2- Log (CPI) coefficient is 0.0009, which this shows the point that by increase of each unit in logarithm of consumption price indices, employment logarithm for nearly 0.0009 would be decreased in this province.

3- Log L (Earn) coefficient is 0.0001, which this shows the point that by increase of each unit in logarithm of annual

earning, employment logarithm for nearly 0.001 would be decreased.

4- Log (GDP) coefficient is 0.004, which this shows the point that by increase of each unit in logarithm of gross domestic product, employment logarithm for nearly 0.004 would be increased. This estimation has a positive and direct effect on employment.

5- Log (MW) coefficient is 0.001, which this shows the point that by increase of each unit in logarithm of minimum wage, employment logarithm for nearly 0.001 would be decreased.

6- Log (pop) coefficient is 0.03, which this shows the point that by increase of each unit in logarithm of population, employment logarithm for nearly 0.03 would be decreased.

7- Log (UI) coefficient is 0.158, which this shows the point that by increase of each unit in logarithm of unemployment, employment logarithm for nearly 0.158 would be decreased. This estimation has a negative effect on employment.

G. Interpretation of results in Isfahan

1- Origin width is -0.009 in Isfahan, which this shows that the factors which are not related to this model are effective in this model.

2- Log (CPI) coefficient is 0.0009, which this shows the point that by increase of each unit in logarithm of consumption price indices, employment logarithm for nearly 0.0009 would be decreased in this province.

3- Log L (Earn) coefficient is 0.0001, which this shows the point that by increase of each unit in logarithm of annual earning, employment logarithm for nearly 0.001 would be decreased.

4- Log (GDP) coefficient is 0.004, which this shows the point that by increase of each unit in logarithm of gross domestic product, employment logarithm for nearly 0.004 would be increased.

5- Log (MW) coefficient is 0.001, which this shows the point that by increase of each unit in logarithm of minimum wage, employment logarithm for nearly 0.001 would be decreased.

6- Log (pop) coefficient is 0.037, which this shows the point that by increase of each unit in logarithm of population, employment logarithm for nearly 0.037 would be decreased.

7- Log (UI) coefficient is 0.158, which this shows the point that by increase of each unit in logarithm of unemployment, employment logarithm for nearly 0.158 would be decreased.

H. Interpretation of results in Mazandaran

1- Origin width is -0.006 in Mazandaran, which this shows that the effective factors out of this model were less in comparing with Isfahan and Fars provinces , whereas the beginning point were downward the origin.

2- Log (CPI) coefficient is 0.0009, which this shows the point that by increase of each unit in logarithm of consumption price indices, employment logarithm for nearly 0.0009 would be decreased in this province.

3- Log L (Earn) coefficient is 0.0001, which this shows the point that by increase of each unit in logarithm of annual earning, employment logarithm for nearly 0.001 would be decreased.

4- Log (GDP) coefficient is 0.004, which this shows the point that by increase of each unit in logarithm of gross domestic product, employment logarithm for nearly 0.004 would be increased.

5- Log (MW) coefficient is 0.001, which this shows the point that by increase of each unit in logarithm of minimum wage, employment logarithm for nearly 0.001 would be decreased.

6- Log (pop) coefficient is 0.037, which this shows the point that by increase of each unit in logarithm of population, employment logarithm for nearly 0.037 would be decreased.

7- Log (UI) coefficient is 0.158, which this shows the point that by increase of each unit in logarithm of unemployment, employment logarithm for nearly 0.158 would be decreased.

I. Interpretation of results in Kermanshah

1- Origin width is 0.01, which this shows the higher effectiveness comparing the factors in this province with other provinces.

2- Log (CPI) coefficient is 0.0009, which this shows the point that by increase of each unit in logarithm of consumption price indices, employment logarithm for nearly 0.0009 would be decreased in this province.

3- Log L (Earn) coefficient is 0.0001, which this shows the point that by increase of each unit in logarithm of annual earning, employment logarithm for nearly 0.001 would be decreased.

4- Log (GDP) coefficient is 0.004, which this shows the point that by increase of each unit in logarithm of gross domestic product, employment logarithm for nearly 0.004 would be increased.

5- Log (MW) coefficient is 0.001, which this shows the point that by increase of each unit in logarithm of minimum wage, employment logarithm for nearly 0.001 would be decreased.

6- Log (pop) coefficient is 0.037, which this shows the point that by increase of each unit in logarithm of population, employment logarithm for nearly 0.037 would be decreased.

7- Log (UI) coefficient is 0.158, which this shows the point that by increase of each unit in logarithm of unemployment, employment logarithm for nearly 0.158 would be decreased.

J. Interpretation of results in Boushehr

1- Origin width is 0.0007 in this province, which this shows low effectiveness of other factors on employment in model.

2- Log (CPI) coefficient is 0.0009, which this shows the point that by increase of each unit in logarithm of consumption price indices, employment logarithm for nearly 0.0009 would be decreased in this province.

3- Log L (Earn) coefficient is 0.001, which this shows the point that by increase of each unit in logarithm of annual earning, employment logarithm for nearly 0.001 would be decreased.

4- Log (GDP) coefficient is 0.004, which this shows the point that by increase of each unit in logarithm of gross domestic product, employment logarithm for nearly 0.004 would be increased.

5- Log (MW) coefficient is 0.001, which this shows the point that by increase of each unit in logarithm of minimum wage, employment logarithm for nearly 0.001 would be decreased.

K. Interpretation of results in western Azerbaijan

1- Origin width is -0.01 in this province, it could be interpreted that other factors which are not related to this model are same in two provinces, western Azerbaijan and Kermanshah.

2- Log (CPI) coefficient is 0.0009, which this shows the point that by increase of each unit in logarithm of consumption price indices, employment logarithm for nearly 0.0009 would be decreased in this province.

3- Log L (Earn) coefficient is 0.001, which this shows the point that by increase of each unit in logarithm of annual earning, employment logarithm for nearly 0.001 would be decreased.

4- Log (GDP) coefficient is 0.004, which this shows the point that by increase of each unit in logarithm of gross domestic product, employment logarithm for nearly 0.004 would be increased.

5- Log (MW) coefficient is 0.001, which this shows the point that by increase of each unit in logarithm of minimum wage, employment logarithm for nearly 0.001 would be decreased.

6- Log (pop) coefficient is 0.037, which this shows the point that by increase of each unit in logarithm of population, employment logarithm for nearly 0.037 would be decreased.

7- Log (UI) coefficient is 0.158, which this shows the point that by increase of each unit in logarithm of unemployment, employment logarithm for nearly 0.158 would be decreased.

L. Interpretation of results in Hormozgan

1- Origin width is 0.0008 in Hormozgan, which this shows the low effect of other factors on model, this situation is the same for boushehr.

2- Log (CPI) coefficient is 0.0009, which this shows the point that by increase of each unit in logarithm of consumption price indices, employment logarithm for nearly 0.0009 would be decreased in this province.

3- Log L (Earn) coefficient is 0.001, which this shows the point that by increase of each unit in logarithm of annual earning, employment logarithm for nearly 0.001 would be decreased.

4- Log (GDP) coefficient is 0.004, which this shows the point that by increase of each unit in logarithm of gross domestic product, employment logarithm for nearly 0.004 would be increased.

5- Log (MW) coefficient is 0.001, which this shows the point that by increase of each unit in logarithm of minimum wage, employment logarithm for nearly 0.001 would be decreased.

6- Log (pop) coefficient is 0.037, which this shows the point that by increase of each unit in logarithm of population, employment logarithm for nearly 0.037 would be decreased.

7- Log (UI) coefficient is 0.158, which this shows the point that by increase of each unit in logarithm of unemployment, employment logarithm for nearly 0.158 would be decreased.

M. Interpretation of results in Sistan and Baluchestan

1- Origin width is -0.021 in this province, which this shows that diagram starts from the lowest point of origin, and other factors which are not related to this model have more effect in comparing with other provinces.

2- Log (CPI) coefficient is 0.0009, which this shows the point that by increase of each unit in logarithm of consumption price indices, employment logarithm for nearly 0.0009 would be decreased in this province.

3- Log L (Earn) coefficient is 0.001, which this shows the point that by increase of each unit in logarithm of annual earning, employment logarithm for nearly 0.001 would be decreased.

4- Log (GDP) coefficient is 0.004, which this shows the point that by increase of each unit in logarithm of gross domestic product, employment logarithm for nearly 0.004 would be increased.

5- Log (MW) coefficient is 0.001, which this shows the point that by increase of each unit in logarithm of minimum wage, employment logarithm for nearly 0.001 would be decreased.

6- Log (pop) coefficient is 0.037, which this shows the point that by increase of each unit in logarithm of population, employment logarithm for nearly 0.037 would be decreased.

7- Log (UI) coefficient is 0.158, which this shows the point that by increase of each unit in logarithm of unemployment, employment logarithm for nearly 0.158 would be decreased.

VIII. TESTS FOR RANDOM EFFECTS

In econometrics, random effects models are used in the analysis of hierarchical or panel data when one assumes no fixed effects. The fixed effects model is a special case of the random effects model. Note that the biostatistics definitions differ, as biostatisticians respectively refer to the population-average and subject-specific effects as "fixed" and "random" effects. Utilization of ordinary least square method is adaptable to use for parameters estimation. In this model, error standard has correlation coefficient, and it is only used in the generalized least squares to estimate parameters.

Model estimation has been accomplished through the method random effects as following:

log (EMP)=2.173-0.002log(CPI) -0.007log   (5)
Log (EMP) =2.173-0.002log (CPI) -0.007log (EARN) +0.008
LOG-0.0002 log (MW)-0.008 log (POP)-0.159 log (UI) + ε_{it}
R-squared =0.87
Adjusted R-squared =0.87
F-statistic =212.44
Durbin-Waston statistic =1.14

IX. SELECTING ONE OF THE METHODS OF FIXED EFFECTS AND RANDOM EFFECTS

We have to specify which model is preferred to be used, here we use Hamsen test. According to Hamsen test, the difference between estimations of fixed effects and random effects is considered as zero hypotheses. Hence, rejecting zero hypotheses shows that fixed effects method is preferred to be used. This test is as following:

$$H=[(B_{fe} - B_{re})^9 -(cov_{fe} -cov_{re})^{-1} (B_{fe} - B_{re})]= x^2 \qquad (6)$$

In above relation Bfe and Bre are respectively coefficient vector in two methods of fixed and random effects; and COVfe and COVre are respectively the covariance matrix of coefficients in two fixed and random effects .Also zero hypothesis and contrast hypothesis are as following in this test :

Zero hypotheses is better to be used in random effects method, and contrast hypothesis is better to be used in fixed effects method.

As observed in relation 6, Hausman test function has x2, asymptotic distribution, and the number of freedom degrees is equal to the explanatory variables of model.

According to Hausman test , if x2 be higher than the critical amounts , in this case zero hypothesis would not be accepted, and the method of fixed effects would be better to be used .also while   x2 is less than critical amounts , in this case zero

hypothesis would be accepted and random effects is better to be used .According to the obtained results from Hausman test, we could decide which method ,fixed and random effects, is better to be used .In this test, all the conditions have been considered in software, and the results show the probability of this model in the software. If the probability be less than 0.1, the fixed effects method would be accepted.

To determine one of the methods of fixed and random effects. The results of Hausman test are as following:

TABLE V.

Test summary	Chi.square	Chi.square	Prob
Cross-section random	14.5282	6	0.0243

X. INTERPRETATION OF FIXED EFFECTS MODEL

Post reviewing and using the tests in order to select the appropriate method , the method of fixed effects was preferred to be used .based on explanatory variables 's effect on dependant variable , in following model within the fixed effects method , we try to estimate the dependant variable (employment).

The model would be as following:

log(EMP)=2.341-0.0009log(CPI)-
0.001log(EARN)+0.004log(GDP)-0.001   log   (MW)-
0.03log(POP)-0.158 log(UI)+ ε_{i1} (7)
R-squared =0.98
Adjusted R-squared =0.98
F-statistic =701.11
Durbin-Waston statistic =1.77

Each of the EMP, CPI,EARN, GDP, MV, POP, UI respectively stands for employment, consumption price index, annual learning , gross domestic product, minimum wage, population, unemployment.

In present research, the employment logarithm has been used as a dependent variable, and this logarithm has been provided to estimate the effect of minimum wage policies, and this method is so common in economic researches. The logarithm of annual earning has been presented to show the effects of change in minimum wage, in which the improvement has been observed in this logarithm, and it has to be mentioned that the minimum wage has been shown with Rial. The logarithm of unemployment rate (UI), and gross domestic product log (GDP), has been used to control the economic in provinces. These variables are used to determine the effects of economic conditions on poverty and employment. Finally, logarithm of population (POP) has been utilized to determine the effects of this logarithm on work force. In this paper while the poverty is a dependent variable , the other variables have been utilized as well, and this is due to the point that poverty may not put any effect on employment, so it is preferred to use

other variables. Also, linear procedures in a particular province were measured in contrast with the fixed effects of a province. Hence, the effects of changes on minimum wage could be measured through combining the changes in time periods in provinces, and making the observations constant in each province. Poverty rate could be obtained through different ways, and also using the minimum wage index to measure poverty rate could be effective as well.

According to the results, it would be observed that all coefficients have the same sign related to theory, and effective parameters on employment are statistically significant.

1- Log (CPI) coefficient is 0.0009, which this shows the point that by increase of each unit in logarithm of consumption price indices, employment logarithm for nearly 0.0009 would be decreased in this province. This estimation has a negative and direct effect on employment.

2- Log L (Earn) coefficient is 0.001, which this shows the point that by increase of each unit in logarithm of annual earning, employment logarithm for nearly 0.001 would be decreased.

3- Log (GDP) coefficient is 0.004, which this shows the point that by increase of each unit in logarithm of Gross domestic product, employment logarithm for nearly 0.004 would be increased.

4- Log (MW) coefficient is 0.001, which this shows the point that by increase of each unit in logarithm of minimum wage, employment logarithm for nearly 0.001 would be decreased.

5- Log (pop) coefficient is 0.037, which this shows the point that by increase of each unit in logarithm of population, employment logarithm for nearly 0.037 would be decreased.

6- Log (UI) coefficient is 0.158, which this shows the point that by increase of each unit in logarithm of unemployment, employment logarithm for nearly 0.158 would be decreased.

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