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Full Length Research Paper

Investigating the effects of capital on the productivity of industries: Evidence from Khorasan Razavi, Iran

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This study investigates the relationship between capital stock and total factors productivity in Khorasan Razavi Province of Iran during 2003 to 2007. In this study, a brief definition and literature of productivity is assessed and the theoretical principles of productivity in domestic and foreign studies will be mentioned. The hypothesis of this study will be analyzed and tested with econometric models in form of Cobb-Douglas production function and integrated data. The obtained results showed that there is a positive and meaningful relationship between the increase of capital stock and the increase of total factors productivity during the mentioned period.

Key words: Partial productivity, total factors productivity, capital stock, industrial groups.

INTRODUCTION

According to prior researches, there are several factors that affect the productivity of firms and enterprises such as labor force training, labor force incentive, labor force wage, environmental factors, organizing the production and accessible capital. Investigating the relationship between capital stock and productivity of industrial enterprises is the main goal of this study.

Productivity which means efficient employing and combining of existing recourses is the issue that creates competitive advantages in firms. As mentioned, one of the effective factors which affect the productivity of firms is the accessible capital.

There are different definitions of productivity by researchers and regional global organizations. Based on Tangen (2002), more than two centuries ago, for the first time, Quesnay in 1766 used the concept of productivity in an agricultural journal. Since that time, this word has been used in different places and levels in relation with economical system. Grossman (1993) stated that the improvement of productivity is a key advantage in competition. In this way, improvement of productivity is one of the popular indexes that could clarify the power of an industrial activity in order to achieve comparative advantages among the industries. Productivity means the level of effective usage of each factor of production. Productivity is the efficient employing of entries or inputs in order to produce goods and introduce outputs. Inputs such as raw materials, instruments, labor force, land and capital are necessary to create outputs either goods or services. According to the previous lines, one of the main instruments for achieving price and quality advantages in competition with others is the income of productivity.

Theoretical principles

Effective employing and combination of the firm's resources means productivity, which creates competitive advantage in firms. Effective improvement of productivity is one of the necessities of organizational work like other factors and software processes in firms.

Some definitions of productivity mentioned effectiveness and efficiency, and concluded that productivity is sum of these two components. Based on the definition of effectiveness and efficiency as the main

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concepts in introducing productivity, we can mention effectiveness as reaching the goals of firm and efficiency as the correct usage of resources. Regarding these two definitions, we can define productivity as doing the right job in the right order to cover effectiveness and efficiency concepts together.

We can mention that the definition of productivity is highly related to the quality of products, quality of inputs and the process of producing. In this situation, we talk about effectiveness and efficiency which means producing good and service with high quality within a minimum time (Mobini, 2004).

Nowadays, improving productivity is one of the priorities in most countries. In fact, managers and Chief Executive Officers (CEOs) of different parts only talk about productivity and usually ignore the true definition of it, so they are not successful in measuring and analyzing it. The definition of productivity is comprehensive and complicated and at the same time simple. Productivity is one of the effective components in economic activities and should not be assumed economically only. Choosing a suitable method of measuring productivity is so important because we need correct results in order to have correct analysis. Knowing the proper definition of productivity is a necessity. Measuring productivity helps to understand it better, and in fact, leads to a balance between theoretical and practical productivity (Oreie, 2009).

The important point in assessing productivity is that it is a relative concept. This means that it should be measured relatively to other components. The pure amount of calculated productivity is not valuable enough because it should be analyzed relatively to other factors. In addition to the fact that productivity is a comparative concept, it has a comparative formula. Relation of outputs to inputs should be assessed relatively to each other. It should be mentioned that many of the outputs are constant and many of them are not constant. Gold (1980), who is one of the famous researchers in productivity, believes that all the methods of calculating productivity should cover costs and benefits for it to be comprehensive.

Types of productivity

There are three types of productivity described:

1) Partial productivity: Relation between outputs with one of the inputs. For instance, human resource productivity, capital productivity or the input productivity which are partial productivity.
2) Total factors productivity: It is pure outputs over the sum of labor inputs and capital inputs. Pure output means value added.
3) Total productivity: All the output factors over all the input factors.

According to the existing literature, there are several definitions and types of capital and financial capital is one of them. Existing researches on the problems of firms in Iran pointed out the shortage of financial resources as one of the boundaries for firms in order to reach the nominal production

LITERATURE REVIEW

There are lots of researches and papers in the area of the key role of productivity in countries' economic growth and sustainable development, and its role in increasing the production of industries and other economical sections including foreign and domestic studies. Tham (1995), in his study on productivity, growth and development in Malaysia, mentioned that the changes in exports and foreign investments are the most important factors affecting the growth rate of productivity. Annual change in ratio of capital on labor, imports and gross investment ratio on total investment negatively affect the growth of the production factors productivity.

Kawai (1994), in his study in Malaysia in 1970 to 1980, by employing the effects of import substitution, effects of developing exports and foreign direct investment on domestic capital stock, found that stability in macro-economic situations has meaningful effects on productivity.

Cameron (1999) stated the effective and positive role of human capital on the improvement of productivity in his study on the total productivity of production factors in Uk.

Sharpe (2003), in his study on the productivity of industries in Atlantic Canada with an accounting approach, investigates the effects of effective factors such as innovation, capital usage, human resource quality and economics of scale on productivity and suggests that innovation is the most important factor among these factors which affect productivity.

Disnay et al. (2003), with an econometric approach, assess the role of internal restructuring like new technologies and structural changes and external restructuring like entering into the market, leaving the market, changes in market proportion on the productivity growth of UK manufacturing and find out that external restructuring approximately affects 50% of labor force productivity changes and 80 to 90% of changes in total factors productivity. Also lots of external restructuring effects are because of multi firms enterprises where plans with high productivity and performance replace the plans with low productivity and performance.

Okada (2004), in his study on the productivity of industries in Japan, mentioned the important role of R & D on the improvement of factors of production productivity in the industries of Japan.

Miller and Robbins (2008), in their study on the productivity through budgeting in the management section of Rutgers University in New Jersey State of USA, showed that budgets have different goals, that all of them can increase productivity. Budgets could be used as a plan, control instrument, motivation method or responsive process.

Azarbaijani (1990) assessed the effective factors on total factors productivity in the industries of IRAN while employing two multi-variable regression model and find out that production in firms, co-efficient of human capital (percentage of educated people), effect of capital or capital over the number of labor, proportion of men labor in total employment of firm, proportion of individuals, salary and value added of inputs do not have any effects on the productivity of factors of production.

Kordbacheh (1993) also used two stage equations including two multi-variable regressions in order to assess the productivity in petrochemical industries. Ghatmiri (1996) investigated the productivity of industries in Iran during 1993 to 1996. They employed literacy index and Kendrick index to calculate the total factor productivity of industries in Iran and also employ regression analysis, capital variable, proportion of private units to total in each industry, role of wage and salary in value added, proportion of employment rate in each industry and value of production in order to assess the effective factors on productivity. They found out that the value of production will positively affect productivity while capital, proportion of capital in labor force and proportion employment in each industry will negatively affect the number of firms in productivity.

Massah (2008), in his study on the financial markets globalization and the process of capital gathering, suggested that one of the important factors of production is capital and in the production process, specific amount of capital is required in addition to labor force and technology.

Trablesi (1998), using the data of 69 countries, find that financial improvement will effectively affect the economy of countries. In this study, he investigates this question: ‘is capital improvement or productivity improvement the source of growth or do both of them affect growth simultaneously?

’Trablesi’s study suggests that financial growth will positively affect the economic growth in studied countries. Also, he mentioned that financial sectors can affect the real part of economy through improvement in productivity of capital. The fact that exists is that through financial growth and economic freedom the distribution of resources will be efficient. Efficient distribution of resources means improvement in economic productivity.

Yasoo (1997) mentioned that in developing countries, the main problem in economic development is the shortage of capital. Thornton (1995) employed the data of 22 developing countries and showed that financial growth will lead to economic growth through increase in productivity. Ansari (1998) suggested that growth in financial factors led to economic development in African countries.

Salimifar (2005), in his study on productivity of factors of production and usage of them in large industries in Khorasan Province of Iran, showed that one of the most effective factors which positively affects the productivity of large industries is the level of capital usage.

Pak (2003), in his paper on the method of attracting financial resources in oil, gas and petrochemical industries, showed that the managers of these industries highly need financial resources for their development plans.

Statement of problem

The goal of this study is to investigate the role of capital of industrial firms in their productivity. The existing production functions like Cobb-Douglas encourage the straight effect of capital on the productivity of labor and total productivity of industrial firms. The simple form of this equation is $Y = AK^{\alpha}L^{\beta}$ where Y represents the value added of industrial group, K represents the capital and L represents the employment in each group of industry. α represents the elasticity of capital and β denotes the elasticity of labor force.

For example, Kui-Waili (2003), in his paper on the level of capital and measurement of productivity in China’s financial resources, investigates the relation of capital and measurement of productivity using the financial resources of China. In order to do this study a Cobb-Douglas production function was designed for China’s economy and then employed two sets of data which one of them was estimated for capital and the other one was estimated for the financial resources of investment. Estimation result of Cobb-Douglas function shows that total productivity of factors of production increases approximately ¾% for the period after changes and among the different resources, funding the foreign direct investment has more efficiency than the amount of funds prepared by the government.

METHODOLOGY

This study employs secondary data in its analysis. In order to analyze the data, an appropriate statistical method like regression will be employed. In general the model that will be used is:

$$Y = AK^{\alpha}L^{\beta}$$

Cross-sectional and time-series data will be used in the regression of this study.

Data gathering method

The required data of this study is gathered from Iran’s statistical center for statistics of the industrial firms, Asian productivity organization (APO) and European productivity organization.

Analysis method

New econometric estimations and reviews of 5 software will be employed in this study to analyze the data. The difference among industry groups of Khorasan Razavi Province prevents them to be gathered together. So, panel data method will be employed to estimate the model. Panel data is the combination of cross-sectional observations during several time series (Baltagi, 2001).

Sample

Statistical society of this study is the industrial groups of Khorasan Razavi Province according to the international scientific industrial category (ISIC). Statistical sample of the study is calculated by the statistical formulas.

Scope of study

The geographical scope of this study covers the Khorasan Razavi Province. The period of 2003 to 2007 is mentioned as the time period of this study. The industrial groups of Khorasan Razavi Province according to the International Scientific Industrial Category (ISIC) is the subject scope of this study.

Model

The Cobb-Douglas production function is one of the production functions firstly used in information technology studies by Brynjolfsson and Hitt (1995 to 1996), Lichtenberg (1995) and some other researchers. Reasons for employing this production function are simplicity and profitability in the practical econometric area (Jorgenson, 1998) and the appearance of the limitations of this production function. Mathematical form of this function is as thus;

$$Y = AK^{\alpha} L^{\beta}$$

Where Y is the real production, K is the capital stock and L is the employed labor force. The estimated forms of this function are in logarithmic forms. This function has constant return to scale and if sum of the coefficients was more than one, there is increasing return to scale and the function is neither concave nor convex (Pazhouhan and Ghareh,1991).

The exponents of inputs are the elasticity of production on each input in this function. Marginal rate of substitution is constant and substitution elasticity is also constant and equal to one (Jahangard, 2005).

In this research Cobb-Douglas production function implies the direct effect of capital stock on labor productivity and total production in industrial firms. Simple form of this function is $Y = AK^{\alpha} L^{\beta}$ where Y is the value added of industrial group, K represents capital and L represents employment in each industrial groups. α And β respectively are representatives of capital elasticity and labor elasticity.

Estimating method of capital stock

There are some papers in Iran which estimate the capital stock like Khonsari method (1983); Kiani and Baghzian method (1992); Shahshahani method (1996); Sedighi and Kordbacheh method (1981); Constant capital stock method (Gharoun, 1993) and exponent method (Kalantari and Arabmazar, 1992).

This study uses investment exponent flow method in order to calculate the capital stock. According to the theories of economic growth, it is acceptable by default that investment will increase with a constant rate during the time. In such a constant growth there will be a specified relation between capital stock and investment. According to this method, capital stock has relation with the Equation 1 (Kalantari and Arabmazar, 1992):

$$I_t = I_0 e^{\lambda t} \tag{1}$$

Where I_t represents the amount of capital generated in year t, I_0 represents the amount of capital generated in the base year and λ is the growth of investment. So the changes in investment can be summarized in Equation 2:

$$I_t = \frac{dk}{dt} \tag{2}$$

According to I_t, the capital stock in base year can be estimated by these equations:

$$k_0 = \int_{-\infty} I_t dt = \int_{-\infty} I_0 e^{\lambda t} dt = \frac{I_0}{\lambda} \tag{3}$$

$$k_0 = \frac{I_0}{\lambda} \tag{4}$$

So in order to calculate k_0 we need to estimate λ by equation estimating investment function in Equation 1. Logarithmic form of this relation is in Equation 5:

$$LnI_t = LnI_0 + \lambda t \tag{5}$$

In respect to the short time period of the capital data in Khorasan during (2003 to 2007), panel data technique is employed in this study to estimate the equation.

Pooled or panel data selection test

F Limer test is the test that is used on this stage. In fact this test is the hypothesis of eliminating the constant factors of the model using F statistical test. In order to employ this test the existing equation will be used:

$$F(n-1, nT-n-k) = \frac{(R_u^2 - R_r^2)/(n-1)}{(1-R_u^2)/(nT-n-k)} \tag{6}$$

Where n is the number of industries, T is the number of time series observations, Ru is the determination coefficient in the fixed effect model, Rr is the determination coefficient in the pooled model.

Null hypothesis in this test implies rejecting the assumption which mentions joint characters in industries. So if this hypothesis is rejected, it can be assumed that the joint characters in industries are meaningful statistically and should be mentioned in the model (combined data). In other situation there is no need to use this method when estimating the integrated data as enough.

Next stage is choosing between fixed effects and random effects in selecting the efficient estimation method. This happens only if the necessity of using individual fixed effects is accepted in the model by F test. Hausman test can also help at this stage. This test obeys

Table 1. Production function estimation regarding one side residual method.

Dependent Variable: Value added logarithm (LN Y)					
		C	**LN L**	**LN K**	**R2** adjusted
Combined data	Coefficient	3.142	0.838	0.205	
	Se	0.158	0.044	0.030	0.996
	T	19.93	19.02	6.70	
Fixed effects (one side residual method)	Coefficient	-3.798	0.900	0.742	
	Se	2.993	0.220	0.148	0.992
	T	-1.278	4.096	5.023	
Random effects (one side residual method)	Coefficient	1.818	0.639	0.439	
	Se	0.450	0.061	0.085	0.849
	T	4.041	10.522	5.161	
	Limer test statistic F=19.11		Hausman test statistic χ^2=1.53		

the Chi square distribution. This test has some hypotheses as follows:

Null hypothesis: There is no difference between using fixed effects and random effects.

Alternative hypothesis: There is difference between using fixed effects and random effects; fixed effects method is more efficient (Reviews 6 software is used in this study).

Generalized least squares (GLS) estimator will be employed to estimate the model through combined and integrated data. Reason of using GLS is that residuals in non specified period may include some of the eliminated factors or non measurable factors which can relate to each other during the time. So it is possible that the residuals are correlated. That is why this method is suitable.

Capital stock estimation

In order to estimate the capital stock, pooled data method was used first. But in limer test, it was not a suitable method; therefore, panel data method was employed. There are the results of estimation.

Therefore, capital stock for each 20 groups of industry is the analyzing scope of study and period of 2003 - 2007 is the time scope of study. Because of the specific character that each industry has compared to others, it seems that fixed effect analysis is a suitable method because it can mention the individual character of industries. This subject is proved with the Limer test statistic and Hausman test statistic which are respectively 348/66 and 21/021. According to the previous explanation, the amount of λ in (4) equation for the specified period and analyzing scope is equal to 0/089. So capital stock of 2003 is the base year for our analyses in these 20 industries. Capital stock of the years after 2003 is calculated in this equation.

$$k_t = \frac{k_{t-1} + I_t}{1+\delta} \quad (7)$$

Where K_t represents capital stock in the specified year, k_{t-1} represents capital stock in the previous year. I_t represents the amount of investment in the specified year and δ represents the depreciation rate of capital. Before the estimation of capital stock in industrial groups of Khorasan Razavi Province, briefly we will mention the characters and stages of estimating model with combined and integrated data method.

Estimated model of production function in Khorasan Razavi's industry General format of Cobb-Douglas equation is used in this study to estimate the production function in Khorasan Province.

$$Y_t = AK_t^{\alpha} L_t^{\beta} e^{ut} \quad (8)$$

After taking natural logarithm from both sides of the equation, we will have this equation as a result:

$$\ln Y_t = a_0 + \alpha LNK_t + \beta LnL_t + U_t \quad (9)$$

Production function estimation

In order to estimate the production function, first the data of value added and number of employed labor in industrial groups of Khorasan will be used. Then we estimate the production function through combined data method whose form of suitable data is clarified through limer test. Regarding the F statistic of estimation, null hypothesis that mentions the same intercepts among the industrial groups is rejected and therefore the integrated data are the most suitable data for this study. Estimation of the model is done in respect to the fixed and random effects models.

Table 1 has the summary of Equation 2 through combined data method, fixed effect or random effect. According to the reported results of Table 1 and the results of Limer and Hausmen test statistics, panel data model with fixed effects is acceptable. In fact, the Limer test statistic is bigger than F value and therefore the correction of the restrictions in the model with residual is rejected. On the other hand, Hausmen test statistic cannot reject the null hypothesis which mentioned the relation of intercepts from explanatory variable.

Estimation of the model in Equation 2 with two sides residual method supports the results of Table 1. The results of this estimation are in Table 2. Random effects method is the best method according to the Limer and Hausman test statistic.

Table 2. Production function estimation regarding two sides residual method.

Dependent variable: Value added logarithm (LN Y)					
		C	**LN L**	**LN K**	**R2 adjusted**
Combined data	Coefficient	0.205	0.838	3.142	
	Se	0.030	0.044	0.158	0.996
	T	6.70	19.02	19.93	
Fixed effects (one side residual method)	Coefficient	0.144	0.915	3.312	
	Se	0.038	0.055	0.753	0.992
	T	3.768	16.515	4.398	
Random effects (one side residual method)	Coefficient	0.465	0.660	1.342	
	Se	0.079	0.034	0.537	0.849
	T	5.878	19.136	2.496	
	Limer test statistic F=37.13		Hausman test statistic X2=1.17		

Table 3. Total factors productivity according to industrial groups and years.

2007	**2006**	**2005**	**2004**	**2003**	**Obs**
4.410000	4.710000	3.600000	3.140000	3.030000	TFP-A
3.300000	2.840000	2.610000	2.030000	1.870000	TFP-B
8.320000	10.66000	7.290000	8.740000	8.870000	TFP-C
7.260000	7.120000	5.610000	7.810000	3.700000	TFP-D
5.590000	6.190000	4.540000	4.530000	3.650000	TFP-E
6.800000	7.000000	4.970000	5.200000	7.170000	TFP-F
1.980000	2.270000	0.970000	1.610000	1.440000	TFP-G
5.620000	4.360000	7.330000	5.330000	4.770000	TFP-H
4.880000	4.030000	3.690000	2.830000	2.640000	TFP-I
6.200000	7.120000	3.960000	2.850000	3.200000	TFP-J
4.350000	3.490000	3.860000	3.200000	3.360000	TFP-K
26.96000	32.25000	25.16000	36.24000	25.03000	TFP-L
6.500000	5.300000	6.490000	3.770000	3.000000	TFP-M
4.880000	5.140000	3.990000	3.300000	2.660000	TFP-N
5.890000	6.150000	5.650000	3.590000	3.520000	TFP-O
7.050000	6.940000	6.060000	4.940000	6.910000	TFP-P
3.530000	2.610000	2.580000	2.390000	1.540000	TFP-Q
8.970000	9.510000	6.080000	4.660000	3.630000	TFP-R
8.000000	11.42000	8.860000	6.220000	5.620000	TFP-S
10.22000	9.870000	8.090000	6.570000	5.210000	TFP-T

Source: Findings of the study.

Variables

The dependent variables of the study are value added of industrial groups in Khorasan Razavi Province (Y) and total factor productivity (TFP) while the independent variables are employment rate in each industrial group of Khorasan Razavi province (L) and capital stock in each industrial group of Khorasan Razavi Province (K).

Total factor productivity (TFP) calculation

Calculation of TFP in this study is done through the estimated production function and solow residuals method (with real data in labor and capital inputs and value added of industrial groups and estimation of labor and capital elasticity and weighted average of them and decreasing them from industrial value added of TPF). The results are in Table 3:

$$TFP = \ln \hat{Y} / L - 4.96 + 0.745 LNK_t + 0.05 LnL_t$$

ANALYSIS OF RESULTS

Increasing the capital stock leads to an increase in total factor productivity (TFP), Ln form of equation is employed in order to test the hypothesis of the study:

$$\ln TFP_t = a_0 + \alpha_1 LNK_t + \alpha_2 LnL + U_t$$

The afore-mentioned model is estimated regarding panel data. The results are as follows:

$$\ln TFP_t = -1.82 + 0.242 LNK_t + 0.068 LnL_t$$

se:	1.448	0.091	0.14
t:	-1.25	2.65	0.48

Regarding the T-student statistic and comparing it with its optimal value of the table, coefficient of capital stock is positively acceptable in 5% level. Therefore, it can be concluded that there is a positive relation between increasing capital stock and increasing total factor productivity in the industrial groups of Khorasan Razavi Province. Coefficients of variables represent the elasticity of total factor productivity to those factors of production because the estimated model is in form of logarithm. In other words, TFP elasticity to capital stock in industrial groups is 0.242 which implies that with one percent increase in capital stock of industrial groups of Khorasan Razavi Province, total factor productivity will increase by 0.242%. So, regarding the above results, hypothesis of this study is accepted.

Conclusions

This study shows that total factor productivity in some industrial groups is more than other groups and there is a positive relation with capital stock in those groups. Hence, this study suggests that in order to increase total productivity so as to increase economic growth, investment has the priority in those industrial groups.

It is realized that increasing the capital of industrial enterprises in Khorasan Razavi Province will solve their problems and guide them to improve their total and partial productivity.

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APPENDIX

Appendix A. Pooled data method.

Dependent variable: LNI?				
Variable	**Coefficient**	**Standard error**	**t-statistic**	**Probability**
C	9.781137	0.111447	87.76460	0.0000
@TREND	0.124904	0.028008	4.459668	0.0000
Weighted statistics				
R-squared	0.963652	Mean dependent variable		15.08871
Adjusted R-squared	0.963281	S.D. dependent variable		10.07737
S.E. of regression	1.931051	Sum squared resid		365.4378
F-statistic	2598.141	Durbin-Watson stat		0.612953
Prob (F-statistic)	0.000000			
Unweighted statistics				
R-squared	-0.002562	Mean dependent variable		9.811610
Sum squared resid	385.9293	Durbin-Watson stat		0.231367

Appendix B. Fixed effect model.

Dependent variable: LNI?				
Variable	**Coefficient**	**Standard error**	**t-statistic**	**Probability**
C	9.633307	0.063621	151.4163	0.0000
@TREND	0.089151	0.021203	4.204569	0.0001
Fixed effects (cross)				
_A—C	2.806390			
_B—C	2.459190			
_C—C	-2.158610			
_D—C	-0.937610			
_E—C	-4.236810			
_F—C	-0.302610			
_G—C	0.137390			
_H—C	-1.470210			
_I—C	1.384390			
_J—C	1.357790			
_K—C	2.036790			
_L—C	0.659190			
_M—C	0.427190			
_N—C	0.838590			
_O—C	1.106190			
_P—C	-2.131410			
_Q—C	-0.809410			
_R—C	2.473590			
_S—C	-1.725810			
_T—C	-1.914210			
Effects specification				
Cross-section fixed (dummy variables)				
Weighted statistics				
R-squared	0.995283	Mean dependent variable		14.81658
Adjusted R-squared	0.994089	S.D. dependent variable		9.167625

Appendix B. Continued.

S.E. of regression	0.704859	Sum squared resid	39.24922
F-statistic	833.4154	Durbin-Watson stat	2.186267
Prob(F-statistic)	0.000000		
Unweighted statistics			
R-squared	0.893249	Mean dependent variable	9.811610
Sum squared resid	41.09305	Durbin-Watson stat	2.186001

Appendix C. Random effect model.

Dependent variable: LNI?				
Variable	**Coefficient**	**Standard error**	**t-Statistic**	**Probability**
C	9.533600	0.455883	20.91236	0.0000
@TREND	0.139005	0.038187	3.640149	0.0004
Random effects (Cross)				
_A—C	2.725915			
_B—C	2.388671			
_C—C	-2.096710			
_D—C	-0.910723			
_E—C	-4.115316			
_F—C	-0.293932			
_G—C	0.133450			
_H—C	-1.428051			
_I—C	1.344692			
_J—C	1.318854			
_K—C	1.978384			
_L—C	0.640287			
_M—C	0.414940			
_N—C	0.814543			
_O—C	1.074469			
_P—C	-2.070290			
_Q—C	-0.786200			
_R—C	2.402658			
_S—C	-1.676321			
_T—C	-1.859319			
Effects specification				
Cross-section random S.D. / Rho			1.865812	0.8714
Idiosyncratic random S.D. / Rho			0.716849	0.1286
Weighted statistics				
R-squared	0.071269	Mean dependent variable		1.661489
Adjusted R-squared	0.061792	S.D. dependent variable		0.740079
S.E. of regression	0.716849	Sum squared resid		50.35957
F-statistic	7.520296	Durbin-Watson stat		1.770240
Prob(F-statistic)	0.007254			
Unweighted statistics				
R-squared	0.010039	Mean dependent variable		9.811610
Sum squared resid	381.0787	Durbin-Watson stat		0.233937