# Investment in transportation and examining its influence on the economical Growth of Iran

Hamid Bahrami

Department of Management, shushtar branch, Islamic Azad University, shushtar, Iran

**Abstract:** Today, transportation is one of the substructure parts of society that not only affects the economical growth process, but also is changed in development. The transportation substructure is one of the substructure parts of services has an important position in the economical development of countries. An efficient and appropriate transportation network causes goods transportation and services costs and also trade expansion in the national level and so industry development. Regarding to the importance of investment in transportation and economical growth, the Granger causality relationship between investment in transportation and economical growth in Iran between 1963 and 2009 is examined in a study by using Tuda and Yamamoto methods. The obtained results shows that there is a one- sided relationship of Granger causality from the impure fixed capital formation under transportation section towards GDP.

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**Keywords:** Investment, transportation part, economic growth, Granger causality relationship, Tuda and Yamamoto methods

## 1. Introduction

Internal and mutual communication of transportation with the Economical, cultural and social development is undeniable. Access to the production sources, markets, increasing buyers and sellers, integration of markets and so buyers and sellers competition, increasing the efficiency of capital and labor are some reasons of transportation and the economical growth relationship. The set of services that cause the goods and production sources transportation have the economic value and are a part of production costs. Transportation not only affects the economical development process of Countries, but also helps to economic by employment. Transportation is an economical part of any country like industry and agriculture that creates job following service production affecting development of another sections. So today employment and created additional value in transportation part is considered as a substructure for the measurement criteria of the economical growth of countries. Regarding to the operated studies by UN, the export expansion causes the success in strategic programs in the south- east countries of Asia such as Taiwan, Korea, Malaysia and Singapore was mainly by the significant investment in substructures and equipment's of Transportation and increasing the management skills of it. The transportation investment is one of the permanent social capitals that cause the production increasing indirectly. The investment in transportation and its related factors merges the market areas reducing the space limitations of production area as possible. That matter causes increasing the buyers and sellers in the boundary points and contact in market area. Transportation needs much capital and so it doesn't back the capital output rapidly and directly. So investment in some parts of transportation such as tracklayer, road construction and airport are only responsibility of government and the private sector. In other words, the private sector alone isn't able to invest sufficiently in substructure sections of transportation. Examining and reviewing the past studies has shown that connection method of investment in substructure of transportation on the economical growth in various areas was different. In other words, examining a cause – effect relationship between the economical growth and substructure growth of transportation in a economic is considered. According to that, in that study the relation between the investing in transportation and the economical growth in Iran will be examined by using the Granger causality method. The questions considered are:

**1-** Is there Granger causality relationship between investing in transportation? And the economical growth of Iran?

**2-** If there is a relation, does is that a one – sided causality relationship or Two – sided one?

## 2- A review on done studies and the empirical evidences:

Reviewing done studies literature about that case, different results have been positive communication substructure investment in transportation and the economical growth. For example de Long and summers (1991, 1992) shows that there is a one –sided Granger causality relationship from investment to the economical growth. So increasing amount of investment growth will be motive of the economical growth. In some of the done studies opposite of the mentioned

relationship has been obtained. Carol and Weil (1994), summers and Heston (1991) and Blomstrom and colleagues (1996) have declared in their researches that the amount of the economical growth of Granger causality is the amount of investment growth. So rate of the fixed investment formation growth increases with increasing the rate of the economical growth. Pudrika and Carmeci (2001) examined Granger causality relationship between the fixed investment formation and the economical growth using Panel data about 104 countries. They have used investment share of GDP as an approximation of the fixed investment formation and the amount of GDP capita growth as the variant economical growth and declared that against the done studies there is a two – sided Granger causality relationship between two variants. In other words, investment share of GDP Granger causality is the amount of GDP capita and vice versa. Madsen (2002) examined Granger causality relationship between investment and the economical growth in 18 member countries of OECD in from 1950 until 1999. The results of that research show that investment in machinery and equipments is Granger causality of the economical growth if the economical growth is Granger causality of investment in non – residential buildings and substructures. So policies increasing the investment in machinery and equipment's will be the effective tools in increasing the economical growth. All of the founds of Nourzad (2000), Shuoji (2001), Mittink and Neumann (2001) and Everaert(2002) are indicator of the positive causality effect of government substructure investment in different areas on the economical growth in the industrial and developed countries. While Macmilan and Smith (1994) founds are indicator of lack of the causality relationship between such investments and the economical growth in the developed countries.

**3- Investment in transportation and the economical growth:**

In the economical growth literature always the benefits and substructure Importance of transportation section have been considered. The investment costs in transportation as a motive from request causes the economical growth and also helps to construct the economical areas. The investment in transportation section such as the roads development and railway changed the economical growth of different areas of world in the nineteenth. The substructure investment to decrease the transportation costs from the border and boundary areas to the central areas is very important. The decreasing of costs has an important role in decreasing of the regional differences and competition improvement by business and the production factors replacement. Also it causes being efficient the production and distribution of products that create the economical profits opportunities and improvement and leads to increasing the skill and the logical changes of system and decreasing the costs. Finally this set of the positive effects result in improving the economical benefit and reforming the relative advantages in different areas. The transportation substructure growth can be by: **1-** Increasing the investment and improving the capital stock quality by constructing the new highways, airports and so on. **2-** Improvement in the effective usage or improvement of efficiency in usage such as creating the additional capacities of substructure capital stock, optimization of transportation organizations by tax, toll and so on. The most important aspect of examining the relationship between transportation and economic is role of substructure investment in transportation and the economical growth. Some of the economists believe that in some of areas that haven't faced to the general transportation compression yet can experience long – term growth in transportation without increasing the investment. Also other studies show that investment in transportation countries having the suitable development perform some developmental limitations on economy of area. Although competition of one area against the neighboring areas increases with the developing investment in transportation in short –term but it happens only in one short – term period because of motion of capital production factors and human power. Berchmen (2001) believe that in a logical range of the regional access having the sufficient substructure in transportation we can access to the economical growth by creating the peace and maintaining the order that hasn't been all in regarding to transportation necessarily. The substructure investment in transportation and improvement in presenting services result in decreasing the costs and increasing the access to actives of various markets such as the institutions presenters, human powers and the goods demanders that cause to market development. Also in that case opportunities for exports and imports increase. Because firstly export development results in the higher production levels and improvement possibility in efficiency. Those two cases is possible by renewal of the economical structure of existing and new agencies and also improvement in production learning processes that causes decreasing production costs and increasing the benefit. Secondly it provides the low transportation costs and easy and spread access to production markets factors. It causes that the production agencies use the production factors from the wider areas and with the higher features. Anyhow because of market compression, some of the interaction effects with production growth may modify the first

intense effects and the positive improvement of transportation. While the production development from market development increases the request for human and land power, wages and rents and results in replacement of part of decreasing the first costs and competition benefits so if the increasing the wages be permanent it causes to migrate the production factors. We must notice that transportation development results
in the economical continuous effects in some of the market interactions. So increasing the benefit and the economical growth are two clear results of the improvement in transportation substructure generally.

**4- The importance of investment in transportation section:**

Generally the transportation section has a special and vital importance in the economical development of countries. Indeed, the economical growth is stopped without access to sources and markets and lack of access to the transportation facilities reduces the quality and level of the life welfare. The empirical studies have shown that the investment in transportation facilitates the exchange. Also the business development in the national and international level provides the nations growth and development background. The done studies in the high economical level of countries that their economic is agriculture show that investment in transportation causes the increasing the economical growth in those countries and investment in transportation substructure by increasing the social efficiency in the private investments. In little economy view, investment in transportation causes decreasing the price of the agricultural data and the production costs directly. It also causes the increasing the access to market, various production achievements and finally development tools of the non – agricultural section of the rural areas. According to the formal reports during 1980 – 1992 the international trade has developed on the average %5 annually in sale and replacement aspects. That amount is a serious assistance on transportation importance in world trade growth in comparison with income level having only %3 growths annually. So the countries such as Japan and Korea found their rapid growth based on the production goods export. It is clear that isn't possible without investment in the internal, regional and international transportation.

**5- Estimating, test and analysis of the pattern:**

In Granger causality test to examine that matter that "$X_t$ hypothesis is
Granger causality of $Y_t$ a VAR model is formed such that:

$$Y_t = \sum_{i=1}^{k} \alpha_i Y_{t-i} + \sum_{i=1}^{k} \beta_i X_{t-i} + u_t \qquad (1\text{-}5)$$

If $\beta_{i=0}$ Granger causality of Yt is not, then Xt Surely in that test pause time K is optional relatively. Geweke (1984) states that importance of that test is related to grade of VAR model and variants permanency. If the variants is inconstant, credit of that test decreases. Granger states when that test is valid that variants aren't sum. So we must examine the permanency and relation of variants sum. If the permanency of variants is from first class not being sum, we can form a VAR model on the first vectors of variants and then perform that test. On the other hand, the results of Granger causality test are very sensitive to the stop time selection. If the selective stop time is less than the real stop time, deletion of the appropriate stops will make diagonal and if the selective stop time is more than the real stop time, the additional stops in VAR model cause that estimations be inefficient. Regarding to that standard test of Granger causality is very sensitive to stop time selection and different stop times often will cause different results, the systematic autoregressive method presented by Hsiao is used to select the optimum stop time for any variants. This method is performed in two steps. In the first step a set of regressions of regressive is estimated on the dependent variant. In the first regression equation, the dependent variant will have one stop and in the next regressions will add one stop respectively. M the regression that is estimated will be in this form:

$$Y_t = \alpha + \sum_{i=1}^{m} \beta_i Y_{t-i} + \varepsilon_{1t} \qquad (2\text{-}5)$$

Stop time selection is on the basis of pattern capacity. It is better we select m large possibly. Also for the regression of any equation, the final error standard of FPE prediction is calculated as:

$$FPE(m) = \frac{T+m+1}{T-m-1} * \frac{ESS(m)}{T} \qquad (3\text{-}5)$$

In that standard T pattern size and ESS is the sum of hysteresis squares. The optimum stop time ( $m^*$ ) obtains the minimum standard of FPE. After determining $m^*$, the regression equations with stops affecting on other Variants are calculated as:

$$Y_t = \alpha + \sum_{i=1}^{m^*} \beta_i Y_{t-i} + \sum_{j=1}^{n} \gamma_j X_{t-j} + \varepsilon_{2t} \qquad (4\text{-}5)$$

After that estimation for any regression, equation FPE standard is calculated according following equation:

$$FPE(m^*,n) = \frac{n+1+T+m^*}{T-n-1-m^*} * \frac{ESS(m^*,n)}{T} \qquad (5\text{-}5)$$

The optimum stop time X creates the minimum standard FPE. We must compare FPE $(m^*)$ $with$ $FPE(m_i^* n^*)$ for Granger causality test. If we conclude $X_t$ is not Granger causality of $Y_t$ . FPE $(m^*)$ < FPE $(m_i^* n^*)$ If FPE $(m^*)$ ≥ FPE $(m_i^* n^*)$ $X_t$ is Granger causality of $Y_t$ . Despite being permanent all of the variants we must take vectors from them to make them permanent and then use the constant vectors of variants to do test.

**6- Tuda and Yamamoto causality test:**

Before Granger causality test, examining the unit root and cumulative is necessary, but as the unit root test have low power and the cumulative tests such as Johanson test aren't reliable in the small examples, that matter will cause the diagonal in Granger causality test. According to that, Tuda and Yamamoto suggested a method to do Granger causality test in 1995 not having those problems. They suggested a simple method as estimation of one modified VAR model to examine Granger causality relationship. They deduct that this method is valid even in conditions of existing the cumulative relationship between variants. In the first step we must determine the number of stops (K), optimum of VAR model and then the maximum permanency degree ( $d_{max}$ )creating a VAR model with stops number on the variants level $(K + d_{max})$. When K ≥ $d_{max}$ , the stop selection is valid. In Zapata and Rambadi (1997) view lack of need to have information about cumulative features is advantage of that method and knowing the grade of VAR model and the maximum permanency grade of variants is sufficient for test.

**7- Introduction of variants:**

The used variants in pattern consist of: (LI) logarithm of the impure permanent capital formation of transportation section to the permanent prices in 1997 and (RGDP) amount of the internal impure production growth to the permanent prices in 1997.

**8- Presenting model, test and analysis of results:**

In Tuda and Yamamoto knowing the permanency grade of variants is necessary so the permanency of variants has been tested by using the generalized Diki – Fuler method. The results of that test have been summarized in the table1.

DLI and RGDP are permanent. References: The result of the research estimates. Regarding to logarithm table of the impure permanent capital formation, transportation section become constant by taking vectors in inconstant level and the amount of the internal impure growth of variant is in permanent level. To examining Granger causality relationship between logarithm variants of of the impure permanent capital formation of transportation section (LI) and the amount of the internal impure growth (RGDP), one VAR model with the number of stops (2) is used. Two stops have been obtained from sum of grade of VAR model and grade of the maximum permanency. The grade of VAR model regarding to SBC criteria is equal with 1. Equations are:

$$RGDP_t = C_1 + \sum_{i=1}^{3} \alpha_{1i} RGDP_{t-i} + \sum_{i=1}^{2} \beta_{1i} LI_{t-i} + \varepsilon_{1t} \qquad (1\text{-}7)$$

$$LI_t = C_2 + \sum_{i=1}^{3} \alpha_{2i} RGDP_{t-i} + \sum_{i=1}^{3} \beta_{2i} LI_{t-i} + \varepsilon_{2i} \qquad (2\text{-}7)$$

The results of Valed test about being meaningful the coefficients with stops of the used in equations (1-7) and (2-7) has been shown in the table 2. According to the table logarithm of the permanent impure capital formation of Granger causality transportation section is the amount of the internal impure production growth. The opposite of that relationship doesn't exist. That obtained result by Delang and summers researches and studies is based on the one – sided Granger causality relationship from investment to the appropriate and harmonious economical growth.

**Table1:** results of Diki – Fuler method test

| variant | | Width from basis | Number of stops | Test statistics | The critical quantities | Meaningful level |
|---|---|---|---|---|---|---|
| **Level** | **LI** | * | **1** | **-2/71** | **-3/73** | **0/5** |
| | **RGDP** | * | **0** | **-3/61** | **-3/02** | **0/5** |
| **The first Vectors** | **DLI** | * | **0** | **-5/32** | **-3/02** | **0/5** |

**Table2:** The results of Valed test

| Related variant | Effective variant | Hypothesis $H_0$ | Valed statistics ( $x^2$)* | result |
|---|---|---|---|---|
| **RGDP** | **LI** | $\beta_{1i}=0(i=1,2)$ | **(0/06) 7/12** | **LI =RGDP** |
| **LI** | **RGDP** | $\alpha_{2i}=0$ | **(0/53) 1/83** | **RGDP=LI** |

The numbers in parenthesis are indicator of considered statistics p-value. References:
The result of the research estimates.

**4. Discussions**

Affecting the economical growth process is changed in development process. Indeed, not only

investment in different fields of transportation causes to strengthen the market in various aspects but also it causes different backgrounds of employment and various usage of anyone from others production goods. Transportation is like bases of a bridge by playing role of a communicator in the usage market that different sections of society move towards the permanent development by passing it. Consequently it causes increasing growth and the economical development. In the present research, we examined Granger relationship between transportation section and the economical growth in Iran in 1963-2009 regarding to investment importance. In that research, the used variants

Consist of the permanent impure capital formation of transportation section and the amount of the internal impure production growth to permanent prices in 1997. To examine Granger causality relationship between

Variants, Tuda and Yamamoto methods have been used that finally a one – sided Granger causality relationship in long – term from the permanent impure capital the formation of transportation section to the amount of the internal impure production growth. The obtained results from the long – term pattern indicate the theoretic expectations and variant pattern such as investment in transportation section has a special importance in the internal impure production. So showing important the investment in transportation is effective on the internal impure production of Iran.

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**Corresponding Author:**
Hamid Bahrami
Department of Management, shushtar branch, Islamic Azad University, shushtar, Iran
E-mail: bahr542000@yahoo.com

**References**

1. Al-Faris, A.F. (2002), Public expenditure and economic growth in the gulf Cooperation council countries, Applied Economics, Vol. 39, pp. 1187- 1193.
2. Ansari, M.I. (1997), Keynes versus Wagner: public expenditure and national Income for three African countries, Applied Economics, Vol. 29, pp. 543 559.
3. Aschauer, D.A. (1989) "Does public capital crowd out private capital?" Journal of Monetary Economics, March , 24, pp. 171-181.
4. Blomstrom , M. et al. (1996). “Is fixed investment the key to economic Growth?” Quarterly journal of Economics, 111, 269-76.
5. Chao J, Corradi V, Swanson N (1999), “An out of Sample Test for Granger Causality”, University of Maryland and Texas A and M University.
6. De Long, J. B. and Summers, L. H. (1991).”Equipment investment and Economic growth”, Quarterly Journal of Economics, 106, 445-502.
7. Garcia-Mila, Teresa and McGuire, T.J. (1992) "The contribution of policy provided inputs to States' economies", Regional Science and Urban Economics 22: pp. 229-241.
8. Geweke, J. (1984).”Inference and causality in economic time series models”.14. Hsiao, c. 1981).”Autoregressive modeling and money-income causality Detection”, Journal of Monetary Economics, 85-106.
9. Green, Joshua and Villlanueva. Delan (1990) "Private investment in developing countries", A Compirical analysis, Working paper.
10. Madsen, B.J. (2002).”The causality between investment and economic Growth”, Economic Lettwrs, 74, 157-163.
11. Valida KS. Geology of Kumaun lesser Himalaya, Wadia Institute of Himalaya Geology, Dehradun, India, 1980;291.
12. Munnell, Alicia H. and Fall, H. (1992), "Infrastructure investment and economic growth," Journal of Perspectives, vol:6, no.4, pp. 189-198.
13. Pesaran, M.h., and Shin, Y. (1995).”An autoregressive distribiuted lag Modeling approach to cointegration analysis”, DAE Working paper, No. 9514, Deoartment of Applied Economics, University of Cambridge.
14. Summer , R. and Heston , A. (1991).”A new set of international comparisions Of real product and price levels estimates for 130 countries”, Quarterly Journal of Economics, 106, 327-68.
15. Thakur, (1980), "Public investment, crowding out and growth: A dynamic model applied to India and Korea", IMF Staff Paper, Vol:27.
16. Toda, H. Y., Yamamoto, T. (1995).”Statistical inference in cover Autoregressions with possibly integrated processes”, Journal of economics 66, 225-250.
17. Zapat, H. O., Rambaldi, A. N. (1997).”Monte-Carlo evidence on cointegration And causation”, Oxford Bulletin of Economics and Statistics59, 285-298.

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