CHAPTER THREE

« Chapter three studies the theoretical discussion. In addition to, this chapter introduces the measurement methods of globalization, F-test and T-test briefly »
3- Introduction:

The basic and fundamental questions in international trade that we seek to answer in this chapter are:

1. Why do Countries trade with other countries?

2. What are the gains obtained from trade?

3. What goods and services are traded?

4. Which goods are imported and exported by each country?

We begin with a brief discussion of the classical theory of international trade by Adam Smith (Trade Based on Absolute Advantage). Then we go on discussing the Theory of Comparative Advantage by David Ricardo (Trade Based on Comparative Advantage).

Finally, in this chapter, we examine and introduce the measurement methods of globalization of economy in detail.

3.1- The basis of global trade:

Why do Countries Trade with other countries? Countries or Nations trade with each other fundamentally for the same reasons that people trade with each other. At this point in time, any state or nation cannot produce all
the commodities and services by itself which its people need for their consumption. The factors of production are distributed unequally over the surface of the earth by nature. Countries differ in terms of population, climatic conditions, labor and capital resources, natural resources, mineral resources and mines, technological capabilities, managerial and educational skills and a whole lot of other variables which determine the capacities of countries to produce goods and provide services.

All these differences in production possibilities result in positions where some countries can produce some commodities more efficiently than others; and none can produce all the services and commodities at the lowest possible cost of production.

India can, for example, produce tea or rice goods more abundantly than any other country in the World. On the other hand, Iran can produce oil and gas more cheaply than other countries, because Iran has rich deposits of oil and gas. Therefore, they trade with each other. Iran can import Indian tea and rice at a lower price, because India has the capacity to produce rice and tea at much lower costs of production and hence to sell them at lower prices to Iran; and in turn Iran can export oil and gas to India at relatively lower prices.
Now is the time to answer the question as to why international or global trade takes place or why countries, states and nations trade among themselves. Nations trade because of the differences in prices and trade takes place due to the differences in prices, costs of production and other related factors.

3.2- Absolute Advantage Model of Adam Smith

According to Adam Smith, trade between two nations is based on absolute advantage. He showed how all countries would gain from international trade through international division of labour. Adam Smith emphasized the division of labor at the international level requires the existence of absolute differences in costs. Every nation should specialize in the production of those goods which it can produce more cheaply than others and deals that commodity with the commodities which cost less in other countries.

Let us explain absolute advantage model of Adam Smith with the help of an example now. Suppose for the sake of simplicity that we have only two countries and two goods in the world. Iran and India are two such countries. Rice and tea are the two goods. The absolute cost differences are illustrated in Table 3.1:
Table 3.1: Absolute Differences in Costs (Before Trade)

<table>
<thead>
<tr>
<th>Countries→</th>
<th>Iran</th>
<th>India</th>
<th>World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice(units)</td>
<td>20</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>Tea(units)</td>
<td>10</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Total Output</td>
<td>30</td>
<td>30</td>
<td>60</td>
</tr>
</tbody>
</table>

The above table shows that Iran can produce and consume 20 units of rice plus 10 units of tea with one unit of labour and India can produce and consume 10 units of rice plus 20 units of tea with one unit of labour.

In this case, Iran has an absolute advantage in the production of rice and India has an absolute advantage in the production of tea.

Opening up of trade gives the two countries an opportunity to specialize in production. It means that trade between Iran and India will benefit both if Iran specializes in the production of rice and India in the production of tea, as is shown in Table 3.2.

After the trade establishment, Iran produces only rice and no tea by applying all the “n” factors of production, Iran produces 40 units of rice now; by using all “n” factors of production to produce only tea India will be able to produce 40 units of tea.
Table 3.2: Production Levels after Trade

<table>
<thead>
<tr>
<th>Countries→</th>
<th>Iran</th>
<th>India</th>
<th>World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice(units)</td>
<td>40</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td>Tea(units)</td>
<td>0</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Total Output</td>
<td>40</td>
<td>40</td>
<td>80</td>
</tr>
</tbody>
</table>

Before trade, Iran’s total output was 30 units and the level of new total output in Iran after trade is 40 units. It can easily be seen from a comparison between before and after trade that the amount of total output in Iran after trade output has increased 10 units. Similarly, it can be shown that after trade the amount of the total production in India has promoted.

As a result of trade between Iran and India, the total output in the two countries increased; it means that they became better off after trade in comparison with before trade. The world total output also went up from a pre-trade level of 60 to a post-trade level of 80. The production of rice and tea has completely specialized after trade. Both countries have been richer; and this is for production gains from global or international trade.

However, trade based on absolute advantage can explain only a small section of world trade at this time. The theory of absolute advantage couldn’t explain most of world trade, especially trade of among developed countries.
It can be explained by the Ricardian theory of comparative advantage. Indeed, Smith’s theory of absolute advantage is unrealistic and weak because there are many underdeveloped countries which do not possess absolute advantage in the production of any goods and yet they have trade relations with other countries.

3.3- Trade Based on Comparative Advantage: David Ricardo

In this section, we first describe the law of comparative advantage; thereafter we will explain it with a simple numerical example. Ultimately, we will prove the law of comparative advantage.

According to David Ricardo, even if countries didn’t have absolute advantage in the production of both commodities over the other, international trade would be beneficial to both countries.

According to the law of comparative advantage, it is not the absolute advantage but the comparative advantage and differences in costs that determine trade relations between two countries. Indeed, the Ricardian theory of comparative advantage is the same as Smith’s model with some modification and improvement. Let us now discuss the Ricardian theory of comparative advantage.
Assumptions of the Theory

Ricardo’s model is based on the following assumptions:\(^1\):

1. There are only two countries, for example Iran and India.

2. They produce the same two commodities; let us say rice and tea.

3. Labor is the only factor of production.

4. All units of labor are homogeneous.

5. The supply of labor and Technological knowledge are unchanged.

6. Factors of production are perfectly mobile within each country, but are perfectly immobile between countries.

7. Goods are produced under the law of constant returns.

8. Trade between the two countries takes place on the basis of the barter system.

9. There is free trade between the two countries, without trade barriers and restrictions.

\(^1\) JHINGAN M. L., International Economics (Delhi, 2004). Pp. 27-28
10. The international market is perfect so that the exchange ratio for the two commodities is the same.

11. All factors of production are fully employed in both the countries.

12. No transport costs are involved in carrying trade between the two countries.

Production costs differ in countries because of geographical division of labor and specialization in production. Ricardo’s model is similar to Smith’s model, but the differences arise from here on. In the Ricardo’s theory, it is assumed that one country has the absolute advantage in the production of one commodity and the other country has the absolute disadvantage in the production of one commodity, but a comparative advantage in the production of one commodity than in the other. In summary, one country’s comparative disadvantage is smaller in one line of production and the other country’s comparative advantage is greater in the other line of production. When these two countries begin to trade with each other, the effect of trade between the two countries will be production and consumption gains.

This is illustrated with the help of a numerical example of trade between Iran and India. Once again, we assume a world of two countries and two commodities that both produce and consume two goods. Iran and India
are the two countries; Rice and Tea are the two goods. The productive capacities and efficiencies of the countries are such that if both countries devoted all their human resources to Rice production, output would be as follows:

- Iran: 200 units
- India: 400 units

If all the resources of the countries were allocated to the production of Tea, output would be:

- Iran: 200 units
- India: 200 units

Assuming each has constant opportunity costs of production between the two products and both economies have full employment at all times. All factors of production are mobile within the countries between Tea and Rice industries, but are immobile between the countries. The perfect competition is deciding factor for the price mechanism.

India has an absolute advantage over Iran in the production of Rice. Both countries are equally efficient in the production of Tea. There seems to be no mutual benefit in trade between the economies. The opportunity costs shows otherwise. Iran's opportunity cost of producing one unit of Rice is one unit of Tea and vice versa. India's opportunity cost of one unit of Rice is 0.5
unit of Tea. The opportunity cost of one unit of Tea is 2 units of Rice. India has a comparative advantage in Rice production, because of its lower opportunity cost of production with respect to Iran. Iran has a comparative advantage over India in the production of Tea, the opportunity cost of which is lower in India with respect to Rice than in Iran. To show these different opportunity costs lead to mutual benefit if the countries specialize in production and trade, consider the countries produce and consume only domestically. The quantities are:

Table 3.3: Production and consumption before trade

<table>
<thead>
<tr>
<th>Countries→</th>
<th>Iran</th>
<th>India</th>
<th>World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>100</td>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>Tea</td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Total Output</td>
<td>200</td>
<td>300</td>
<td>500</td>
</tr>
</tbody>
</table>

India produces and consumes 200 units of Rice plus 100 units of Tea, for a total gross domestic product of 300 units. Iran produces and consumes 100 units of Rice plus 100 units of Tea for a total gross domestic product of 200 units. The world gross domestic product is 500 units. Therefore Table 3.3 presents pre-trade equilibrium situation. Given the production capabilities of each country, in order for trade to be worthwhile Iran requires a price of at least one unit of Rice in exchange for one unit of Tea; and India
requires at least one unit of Tea for two units of Rice. The exchange price will be somewhere between the two. The remainder of the example works with an international trading price of one unit of Rice for 2/3 unit of Tea. If this two countries specialize in the goods in which they have comparative advantage, their outputs will be:

Table 3.4: Production levels after trade

<table>
<thead>
<tr>
<th>Countries→</th>
<th>Iran</th>
<th>India</th>
<th>World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>0</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>Tea</td>
<td>200</td>
<td>0</td>
<td>200</td>
</tr>
<tr>
<td>Total Output</td>
<td>200</td>
<td>400</td>
<td>600</td>
</tr>
</tbody>
</table>

World production of Rice increases but world production of Tea remains constant. Using the exchange rate of one unit of Rice for 2/3 unit of Tea, Iran and India are able to trade to yield the following level of consumption:

Table 3.5: Consumption levels after trade

<table>
<thead>
<tr>
<th>Countries→</th>
<th>Iran</th>
<th>India</th>
<th>World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>150</td>
<td>250</td>
<td>400</td>
</tr>
<tr>
<td>Tea</td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Total Outgo</td>
<td>250</td>
<td>350</td>
<td>600</td>
</tr>
</tbody>
</table>
Iran trade 100 units of Tea for 150 units of Rice. Both benefit and now consume at points outside their production possibility frontiers.

So far, we have explained the Ricardian theory of comparative advantage in words and then restated it with a simple numerical example. In the end, we proved with the help of a numerical example that according to David Ricardo, even if countries didn’t have absolute advantage in the production of both commodities, over the other country, international trade would be beneficial to both countries.

New Trade theories try to explain several facts about trade, which the two main models above have difficulty with. These include the fact that most trade is between countries with similar factor endowment and productivity levels and the large amount of multinational production (i.e. foreign direct investment) which exists¹. By the way, as it is showed we can conclude that globalization and international trade increase benefits and incomes of all countries which trading each other. Now is the time to introduce the methods of measurement of globalization.

¹ Source: comparative advantage - Wikipedia, the free encyclopedia.mht
3.4- The Measurement Method of the Globalization of economy

It must primarily be mentioned that almost all the studies carried out about the globalization of economy emphasize that the measurement of the Globalization is in its early stages. Therefore, there are various theories about the measurement methods and different variables are introduced as indexes. On the other hand, all the available studies express that the measurement of the Globalization has been applied to industry due to its unique nature.

A series of studies have been carried out about the effects of the Globalization on the public consumption some of which are as follows:

Cusack (1997), Swank (1997), Quinn (1997), Garrett (1998), and Rodrik (1998) consider the effects of the International Market Integration on the behavior of the public consumption\(^2\). In the two studies about the effects of the Global Trade Integration (Garrett 1998 and Rodrik 1998) this index has been considered as the sum of import and export in comparison to GDP\(^3\). Also in studying the Capital Market Integration, some variables such as Foreign Direct Investment, borrowing from International Markets\(^4\) (Swank,

\(^3\) Note: this index is named as the degree of trade openness as well.
\(^4\) Ibid, p. 10
1997), the normalized absolute value of the difference between saving and investment (Cusack, 1997) and liberalization degree of the capital market have been used as the indexes of the Globalization.

One of the valid indexes which have been employed as the criterion of the globalization of economy is the inter-industry trade index (IIT), which is also called the Integration of International Trade.

Makhija, Kim and Williamson in a study on chemical industries have used this index together with Level of International Trade index (LIT) as the criteria of globalization. This index has been used by Mehrara and Rustemian (2003), Kalbasie and Majidi (1998) and Komijani and Nouri (1999) in order to evaluate the globalization of economy in Iran.

Komijani and Nouri have used these criteria in order to study the process of globalization of agricultural sector.

Mehrara and Rustemian have employed the IIT criterion to evaluate Iran’s trade integration into universal economy and conclude that level of trade and economic integration of the country into universal economy is very low.
Kalbasie and Majidi, using these two (IIT and LIT) criteria have analyzed the influence of globalization on the three kinds of goods – intermediary, capital, and consumptive. The present research also uses the two IIT and LIT criteria as the indexes for the evaluation of the level of Iran’s agricultural globalization and the trade integration of Iran’s economy into universal economy. Therefore, the two criteria will be studied in more details further in this section.

The first criterion is named as the Level of International Trade (LIT) which shows the expansion of international communication in a certain industry or field. The mentioned index is thus calculated:

\[
\text{LIT} = \frac{(X_t + M_t)}{P_t + M_t - X_t} \quad \text{(A)}
\]

In the above formula LIT stands for the Level of International Communication, \(X_t\) for Export, \(M_t\) for Import, and \(P_t\) for Production of industry or field. The smaller value of LIT implies that the import/export mode is not an important aspect of the industry or field; that is, regarding its production volume it does not participate much in trade. Although LIT is an
essential parameter, it is not sufficient for measuring the globalization of economy.

The second criterion is called as the Integration of International Trade (IIT) index is employed in measuring the global integration of some industry. This criterion which in fact is Grubel and Loyd’s standard parameter is thus formulated:

\[ IIT = 1 - \left[ \frac{|X_t - M_t|}{X_t + M_t} \right] \]  

(B)

value of IIT index ranges between zero and one. Zero indicates the absence of trade within the industry or field; that is, trade is only confined, in this case, to import or export. And “1” indicates a complete trade within the industry; that is, import equals export.

The IIT index possesses some unique attributes which render it a reliable index. Researchers have in fact, realized that IIT is quite suitable for conceiving the globalization in an industry or field (Komijani and Nouri 1999, Kobrin 1991, Porter 1986 etc.). The IIT index is an appropriate criterion for actual integration because:

a) Empirical and practical evidence assure us that IIT is dependent on the
Factors identified for Globalization;

b) Previous studies show that IIT has positive relation to the factors which affect Globalization.

Some studies have also shown that the IIT has a positive relation to foreign direct investment and appearance of the multinational corporations.

The results of the studies carried out in this field have proved that the IIT criterion is a very appropriate index for representing the Globalization process.
3.5- **Statistical Data Analysis: Methods of Hypotheses Testing**

The most common kind of statistical inference is hypothesis testing. In other words, testing hypotheses is an essential part of statistical inference. Statistical data analysis allows us to use mathematical principles to decide how likely it is that our sample results match our hypothesis about a population. The hypotheses are often statements about population parameters like expected value and variance.

**Null Hypothesis:**

The null hypothesis, H₀, represents a theory that has been put forward, either because it is believed to be true or because it is to be used as a basis for argument, but has not been proved. For example, in a clinical trial of a new drug, the null hypothesis might be that the new drug is no better, on average, than the current drug. We would write

H₀: there is no difference between the two drugs on average.

We give special consideration to the null hypothesis. This is due to the fact that the null hypothesis relates to the statement being tested, whereas the

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5 Note: in this section of study, we have only explained the testing method and tools (T-test and F-test) that we will use them in chapter five for our hypotheses testing.
alternative hypothesis relates to the statement to be accepted if / when the null is rejected.

The final conclusion once the test has been carried out is always given in terms of the null hypothesis. We either "Reject H₀ in favor of H₁" or "Do not reject H₀"; we never conclude "Reject H₁", or even "Accept H₁".

If we conclude "Do not reject H₀", this does not necessarily mean that the null hypothesis is true; it only suggests that there is not sufficient evidence against H₀ in favour of H₁. Rejecting the null hypothesis then, suggests that the alternative hypothesis may be true.

**Alternative Hypothesis:**

The alternative hypothesis, H₁, is a statement of what a statistical hypothesis test is set up to establish. In our example, in a clinical trial of a new drug, the alternative hypothesis might be that the new drug has a different effect, on average, compared to that of the current drug. We would write

\[ H₁: \text{the two drugs have different effects, on average.} \]

The alternative hypothesis might also be that the new drug is better, on average, than the current drug. In this case we would write
H₁: the new drug is better than the current drug, on average.

**Student’s t-test:**

A t-test is any statistical hypothesis test in which the test statistic has a Student’s t distribution if the null hypothesis is true. It is applied when sample sizes are small enough that using an assumption of normality and the associated z-test leads to incorrect inference.

**Two Sample t-tests:**

A two sample t-test is a hypothesis test for answering questions about the mean where the data are collected from two random samples of independent observations, each from an underlying normal distribution:

\[ N(\mu_1, \mu_2 \text{ and } \sigma^2_1, \sigma^2_2) \]

When carrying out a two sample t-test, it is usual to assume that the variances for the two populations are equal, i.e.

\[ \sigma^2_1 = \sigma^2_2 = \sigma^2 \]

The null hypothesis for the two sample t-test is:
H₀: µ₁ = µ₂

That is, the two samples have both been drawn from the same population. This null hypothesis is tested against one of the following alternative hypotheses, depending on the question posed.

H₁: µ₁ is not equal to µ₂
H₁: µ₁ > µ₂
H₁: µ₁ < µ₂

Calculations:

**Independent one-sample t-test**

This equation is used to compare one sample mean to a specific value µ₀.

\[ t = \frac{\bar{X} - \mu_{H₀}}{\hat{\sigma} / \sqrt{n}} \]

In this formula, \( \hat{\sigma} \) is the standard error of the mean (SE mean). Because the population standard deviation is not known, we have to estimate the SE mean. It can be estimated by the following equation:

\[ \hat{\sigma} / \sqrt{n} \]
Where

\[ \hat{\sigma} \] is the sample standard deviation. The degrees of freedom used in this test is \( n - 1 \).

For example, if \( X, \mu, \hat{\sigma} \) and \( n \) are as follows:

\[
X=90, \mu=100, \hat{\sigma}=14 \text{ and } n = 25
\]

Where

\[ \hat{\sigma}_x \] is the sample standard deviation or \( s \).

In our example, \( \hat{\sigma}_x \) is:

\[
\hat{\sigma}_x = 14 / \sqrt{20} = 3.13
\]

Next we obtain the t-value for this sample mean:

\[
t = \frac{X - \mu \pm \sigma}{\hat{\sigma}_x} = \frac{(91-99) / 3.13}{3.13} = -2.555
\]
Finally, this t-value must be compared with the critical value of t. The critical t-value marks the threshold that – if it is exceeded – leads to the conclusion that the difference between the observed sample mean and the hypothesized population mean is large enough to reject $H_0$. The critical t-value equals the value whose probability of occurrence is less or equal to 5 percent. From the t-distribution tables, one can find that the critical value of t is +/- 2.093. 

Fig. 3.1: Finding Critical Value

Since the retrieved t-value of -2.55 is smaller than the critical value of -2.093 (as shown in table of appendix H), the null hypothesis must be rejected.

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6 making sense of the two-sample T-Test: Europe.isixsigma.com/st
Critical Value(s):

The critical value(s) for a hypothesis test is a threshold to which the value of the test statistic in a sample is compared to determine whether or not the null hypothesis is rejected. The critical value for any hypothesis test depends on the significance level at which the test is carried out, and whether the test is one-sided or two-sided.

Critical Region:

The critical region CR, or rejection region RR, is a set of values of the test statistic for which the null hypothesis is rejected in a hypothesis test. That is, the sample space for the test statistic is partitioned into two regions; one region (the critical region) will lead us to reject the null hypothesis H0, the other will not. So, if the observed value of the test statistic is a member of the critical region, we conclude "Reject H0"; if it is not a member of the critical region then we conclude "Do not reject H0".

Statistical Data Analysis: p-value

In statistical hypothesis testing we use a p-value (probability value) to decide whether we have enough evidence to reject the null hypothesis and say our research hypothesis is supported by the data.
The p-value is a numerical statement of how likely it is that we could have gotten our sample data even if the null hypothesis is true. By convention, if the p-value is less than 0.05 (p < 0.05), we conclude that the null hypothesis can be rejected. In other words, when p is lesser than 0.05 we say that the results are statistically significant.

**Testing the Overall Significance of a Multiple Regression:**

As we know, we can not use the usual t-test to test the joint hypothesis that the true partial slope coefficients are zero simultaneously. Therefore, we will use the F-test instead of t-test. Thus, we summarize the preceding F-test procedure as follows.

Consider following the K-variable regression model:

\[ y_i = a_0 + a_1 x_1 + a_2 x_2 + a_3 x_3 + a_4 x_4 + \ldots + a_k x_k + u_i \]

Where

The \( y_i \) is a dependent variable; the \( x_1, x_2, x_3, \ldots, x_k \) are independent variables and the \( a_0, a_1, a_2, a_3, \ldots, a_k \) are parameters or regression coefficients.\(^8\)

---

Now, to test the simultaneously null hypothesis, we can write:

Null Hypothesis $H_0$: $a_1 = a_2 = a_3 = \ldots = a_k = 0$

It means that all slope coefficients are simultaneously zero. Against,

Alternative Hypothesis $H_1$: $a_1 = a_2 = a_3 = \ldots = a_k \neq 0$

(I.e. not all slope coefficients are simultaneously zero.)

To test this hypothesis, we must compute the amount of $F$:

There are several formulas for $F$ that the simple one of them is shown the following.

\[ F = \frac{n-k}{k-1} \times \frac{ESS}{RSS} = \frac{n-k}{k-1} \times \frac{ESS}{TSS-ESS}, \text{ or} \]

\[ F = \frac{ESS}{RSS} \frac{df}{df} = \frac{ESS}{RSS} \frac{k-1}{n-k} = \frac{Changes \ Due \ to \ Regression}{Changes \ Due \ to \ Residual} \]

As we all know before,

\[ TSS = ESS + RSS \Rightarrow 1 = \frac{ESS}{TSS} + \frac{RSS}{TSS} \]

Now, we define $R^2$ as:

\[ R^2 = \frac{ESS}{TSS} \]
Or, alternatively, as: \( R^2 = 1 - \frac{RSS}{TSS} \),

Thus, it can be written:

\[
F = \frac{n-k}{k-1} \times \frac{R^2}{1-R^2} \text{ (an important relationship between } R^2 \text{ and } F) 
\]

Follows the F distribution with \( k-1 \) and \( n-k \) degree of freedom,

Where,

\( Df. = \) Degree of freedom, \( k = \) the number of parameters, \( n = \) the number of observations and \( R^2 = \) Multiple coefficient of correlation

Also, the TSS and ESS are the total sum of squares and the explained sum of squares respectively, and the RSS is residual or unexplained variation of the \( Y_t \) value about the regression line.

If \( F \) (i.e. the obtained-\( F \)) > \( F_{\alpha(k-1,n-k)} \) i.e. table - \( F \), we can reject \( H_0 \); otherwise we can not reject it, where \( F_{\alpha(k-1,n-k)} \) is the critical \( F \) value at \( \alpha \) level of significance and \( (k-1) \) numerator df and \( (n-k) \) denominator df.

Alternatively, if the \( p \) value of \( F \) obtained from the above-mentioned formula is sufficiently low, we can reject \( H_0 \).
References:


4- Komijani, Akbar and Nouri, Kyoumars (1999), ‘Globalization of Economy and Its Effects on Iran’s Agriculture’: Economy and management Quarterly, vol.46, pp. 5-25


11. ^http:// Europe.isixsigma.com/st/ making sense of the two-sample T-Test