Connect: Children with School and Workers with Wages in Bangladesh

PAUNIĆ, ALIDA

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Connect: Children with Schools

Employees with Wages

in Bangladesh

Summary

Recent attempts of wage rise, problems of security at work place as well as many findings about child labor in Bangladesh were primary cause of writing this paper. But problems have deep roots: from world separation of capital and labor, profit increasing scenarios with labor inputs, human rights to work and get paid to environmental problems connected to increased production in the region. How to induce pay rise to average world level, forbid child labor, induce regional cooperation, are just a few questions that are tried to answer in paper.
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PART I : Stories of the same latitudes or longitudes

1. OVERALL

The main reason for this research about Bangladesh is the fact that high number of children work only and 10.1%, to 6.8% are able to go to school but work at the same time. This fact was given due to the published data from the Office of Child Labour Force Labour US Department of Labour and is recognized by UN bodies, also.

Very disturbing fact besides not be able to enjoy benefits of education and childhood is very small payment - only $10 month and dangerous working conditions filled with various hazards especially if it is a word about agricultural work - what in majority of cases is. Country itself is fighting against that fact with improving school living conditions of people, world organisations are giving money to different monitoring programs (around 9 mill $ ) but this measures are too slow, weak until all participants on the country field contribute to maximum in effort to abolish this fact ( under this is meant families, local surroundings, huge number of multicitations that obtain profits and Government of Bangladesh).

![Diagram](Picture 1)
Country is situated on the Bengal delta, established 1947 and is Parliamentary Republic. On this territory of high vulnerability due to big delta and Indian sea from one side and high mountings of Himalaya on the other country is faced with many natural problems also. It has 56.977 sq mile and population of around 160 mil people being 8th the most populous country with high density and due to high environmental concern questions many are in potential danger. Situated at the Tropic of Cancer are often experienced natural calamities such as floods, tropical cyclons, tornados, tidal change, soil degradation, erosion etc. One cyclon, for example, in 1991 killed 140 000 people. In 1998 the most severe flooding occurred where 2/3 of a country was under the water due to unusually high monsoon rains shed off an equally high amount of melting water that year. Trees that usually would have intercepted rain water had been cut down for firewood or to make space for animals.

Another danger is potential of rising sea water level that could create large number of refugees and with water contamination this number of potentially indangered people could growth. Besides danger it is one of the world the most beautiful places where in the mangrove forest home found many beautiful flora and fauna including Royal Bengal Tiger.

Islam is major religion (87% of population) but importance have Hindu (9%) Buddhism (1%) Christianity (0.5%).

It is a country that is recognised among next 11 potential economic powers, but still with low income per capita od 1,044 %, or 153 bill $ in total drastically lagging after mid income countries in the world.

Successes are achieved in manufacturing: cloth industry where the country exports is amonge top 3 in the world employing 3 mil of workers of which 90% are women. How huge growing business it is
shows the fact that export in garment industry obtained $5 bill in 2002 while in the 2011/2012 it reached $18 bill due to extreme low cost of labour.

Another amazing fact is that it is active in agriculture where producing: fish (5th), rice (4th), potato (11th) mango (9th) pine apple (16th) tropical fruit (5th) onion (16th) banana (17th) jute (2nd) tea (11th) place on the world scale.
2. MODEL

Before starting a notion about possible ways to increase current wage rate/ abolish child labor in large number of factories in Bangladesh some basic facts about investor reasoning are presented. The main motive entering Bangladesh market for investor is a profit gain that is present due to lower overall direct production costs: labor, tax, energy etc.

Profit = \(-I + \frac{(R-C)}{(1+r)} + \frac{(R-C)}{(1+r)^2} + \cdots + \frac{(R-C)}{(1+r)^n} + \frac{\text{Scrap}}{(1+d)^n}\)

If \(Profit_{Bangladesh} > Profit_{Original\ Country}\) investor considers following steps:

A) Investment is the sum of buying or leasing the land, paying taxes to Government, putting construction at the place and buying machines. It also includes pre-feasibility study and clear aim about future potential markets and transport routes and costs.

\[Investment_{Bangladesh} = a + b_1 \cdot \text{Land} + b_2 \cdot \text{Construction} + b_3 \cdot \text{Machines} + b_4 \cdot \text{Workers education} + e\]

Land in Bangladesh is relatively cheap for big capital from the western developed countries perspective, cost of construction is also competitive since labor force in Bangladesh is undervalued compared to prices of construction workers elsewhere, tax rates are usually determined to attract investor and not to repel possible good opportunity for new jobs and markets, than a lump sum of environmental fees, facing some community challenges such as water usage or pollutions and requirement about construction of additional infrastructure to city or area are part of process that is called set up an investment.

Price paying a significant role is stressed in formula that says.

\[I_{Bangladesh} = a + b_1 \cdot \text{Land (quantity)} \cdot \text{Price}_{Bangladesh} + b_2 \cdot \text{Construction Price}_{Labor} + b_3 \cdot \text{Construction Price}_{Material} + b_4 \cdot \text{Workers education (hours)} \cdot \text{Price}_{Bangladesh} + e\]

\[I_{Investor\ Country} = a + b_1 \cdot \text{Land (quantity)} \cdot \text{Price}_{Investor\ Country} + b_2 \cdot \text{Construction (Price Labor)} + b_3 \cdot \text{Construction Price}_{Material} + b_4 \cdot \text{Workers education (hours)} \cdot \text{Price}_{Investor\ Country} + e\]
If and only largely

\[ NPV_{Bangladesh} > NPV_{original\ country} \]

Investment is started and new process of production is taken place.

To add to reasoning interest rates of a credit are obtained in the country of origin with high amount of money supplied and low interest rates. Assuming global finance availability -this notion is not separately stressed in equation.

B)  

Second fact is the costs of production. They include labor costs, energy of production, material, other inputs, taxes to payments, taxes to local governments, fees, other costs.

It is important to recognize direct cost, indirect costs inside company and to allocate activities in order to follow processes as the number of worker increase or new machines is put into production. This can result in lower higher energy cost, different CO₂ emissions and cost related, or makes a fair ground to worker payment.

\[ Total\ Cost = a+b*Direct\ costs\ \ (Product\ 1,\ldots,\ Product\ n) + c*Indirect\ Costs\ \ (To\ all\ products\ in\ company) + e \]

\[ Direct\ Cost = a+b*Material + c*Services + d*Energy\ used + e*Labor\ wages + f*Other\ direct\ costs \]

\[ Indirect\ costs = a+b*Fees + b*Taxes + c*Insurance + d*Wages\ of\ management + e \]

Indirect cost can be allocated to certain product or service on the base of profit, revenue, quantity of effort or some other quantifiable way of measurement.

\[ C_{product} = f_1\ (c_1,\ material) + f_2\ (c_2,\ effort) + f_3\ (c_3,\ energy) + f_4\ (c_4,\ indirect\ cost) + e \]
C)

Revenue is obtained as the formula that contains

\[ \text{Profit} = (R-C) \text{ direct} \times Q + (R-C) \text{ indirect} \times Q + \text{Profit Margin} \]

where profit is obtained by Profit/quantity of goods sold on the market

Direct costs are: cost of production, transport costs, energy cost, environment direct costs

Indirect costs are: marketing, fashion shows, magazines, cost of warehouse lease, cost of salaries of sellers of goods, environmental indirect costs, management costs etc.

<table>
<thead>
<tr>
<th></th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Price structure</strong></td>
<td><strong>structure</strong></td>
</tr>
<tr>
<td><strong>Country of Origin</strong></td>
<td>Bangladesh</td>
</tr>
</tbody>
</table>

*Price of product in country origin > Price of product from production in Bangladesh*

Once when the market is established no price cutting is necessary to the seller – except seasonal discount offers (Christmas, Easter, End season) while the price is much competitive with production price is goods are made in western economies.
This kind of new way to organize production and selling activities that are established by large international organizations is not a static process. It changes every day in respect of tax decision of local governments, cost adaptation, workers struggle to increase wages at least to world average, desire of western workers to attract some of production processes in their own countries etc.

The reasoning for the new entrants on production market is also subject to calculation and cost measurement where he needs to increased cost of labor on expense to transport, some other costs in order to attract the best workers in Bangladesh, gain some marketing advantage in production or selling process.

Than is the price in equilibrium on the market no new entrants are coming so the price has the different structure

<table>
<thead>
<tr>
<th>Gain</th>
<th>Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indirect (selling, advertisement)</td>
<td>Indirect</td>
</tr>
<tr>
<td>Transport costs</td>
<td>Transport</td>
</tr>
<tr>
<td>Direct costs</td>
<td>Direct</td>
</tr>
</tbody>
</table>

Price structure original country       Price structure Bangladesh
2.1. CHANGE COMES FROM INSIDE THE COMPANY-SUCH AS WORK UNIONS

After foreign investor started production his aim is profit maximization and in this respect he keeps an eye on the cost of labor, energy, material and taxes as the most important. He is usually not willing to increase the salary much about national average, and with all types of behavior – especially in marketing- he blends into country picture. Additional presentation is in form of support of various humanitarian, natural organizations but no major change in negative stands in country is occurred.

Different parties, however, are facing different challenges in desire to keep or change to position.

<table>
<thead>
<tr>
<th>LABOUR</th>
<th>MARKET</th>
<th>CAPITAL</th>
<th>Worker Union</th>
<th>CHILD WORK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payment</td>
<td>There are more potential for further employment</td>
<td>Capital is forced to work with Union</td>
<td>Exist in current factory</td>
<td>It has occurred sometimes or regularly</td>
</tr>
<tr>
<td>Current Payment</td>
<td>At market exist workers at lower salaries</td>
<td>Capital can move or not easily in another region</td>
<td>Existence is lower in sector in country</td>
<td>It is common in country</td>
</tr>
<tr>
<td>Prospect of future earnings</td>
<td>Market is not united in requiring rights</td>
<td>Capital work toward union disagreements and division inside union</td>
<td>Country do not follow union due to high unemployment or much lower average salaries</td>
<td>Payment is not regulated ; monitored, at equal foot with adult labor</td>
</tr>
<tr>
<td>Earning formula</td>
<td>Government support workers or hinders Potential impact to macro economy/investor decisions</td>
<td>Capital do not allow workers to be part of any union</td>
<td>Union is too weak in relation to work conditions, salaries and over time work.</td>
<td>Child labor approved by families</td>
</tr>
<tr>
<td>Country average</td>
<td>Government works with investor to decrease tax and</td>
<td>Capital have formula for workers ; but this</td>
<td>Union is aggressive so capital consider</td>
<td>Child labor strictly forbidden but still exist –</td>
</tr>
</tbody>
</table>
Problem of low salaries of textile workers in Bangladesh can be solved inside company in following ways:

Worker wage is at first determined

As \( \text{Wage} = a_1 \times \text{quantity of goods produced} + a_2 \times \text{fixed payment} + e \)

\( \text{Gross wage} = a_1 \times \text{time at work} + a_2 \times \text{minimum quantity of goods produced} + a_3 \times \text{over average goods produced} + e \)

Since so many international companies run operations in Bangladesh they clearly do support current work contracts. In order to change potential over abuse in relation to domestic or international standards game of negotiation has been induced on side of working population in order to:
1. Improve working conditions

2. Increase additional benefits to employees

3. Increase salary over the national average and fight for profit oriented structure of end gain

4. Do not allow child labor

To improve working condition can be relatively easy to negotiate with foreign investor due to fact that game thinking looks like:

<table>
<thead>
<tr>
<th>(0,1)</th>
<th>Increase wage for the activities done</th>
<th>Increase wage</th>
<th>(1,1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Working condition only to certain extent improved</td>
<td>Better working conditions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In that case only the strongest youngest can expect improvement –but in short run-</td>
<td>Lower environmental costs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>since other benefits are not achieved</td>
<td>Lower cost of electricity</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lower health problems</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(0,0)</th>
<th>No increase in wage rise</th>
<th>Improve working conditions</th>
<th>(1,0)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No improvement in working conditions</td>
<td>Do not change wage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lose/Lose strategy for both Health, environmental problems, possibilities of fines, etc.</td>
<td>Better health conditions</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lower possibilities of extra cost for investor</td>
<td></td>
</tr>
</tbody>
</table>
By introducing additional salary gains production process can benefit in many aspects: bigger productivity, worker satisfaction, more just labor division of labor etc. It can be presented by workers who at best know how the production process is working or Union that can negotiate on behalf of workers.

\[ \text{Wage} = a + b (e + x + gy) \]

\( b = \text{basic rate of salary} \)

\( e = \text{unobserved effort (based on hour worked)} \)

\( x = \text{observed effort (products produce)} \)

\( y = \text{other risk} \)

![Graph showing wage and time relationships](image)

Workers at first supply labor at time \( t_1 \) and efforts \( e_1 \). If choose to increase time spend at work they should work \( t_2 \) and obtain salary \( M_2 \). After years of work their effort decrease time preference change and they try to obtain salary \( M_3 \) with lower time \( t_1 \) but with another duties such as better quality, good management of processes, education of new workers etc.

Since the wage is influenced by time, work supplied is time constrained workers do not achieve better wage on process itself and then should look at the average of country, profitability of sector in the world, success or financial results of international company they work for, or some other macroeconomic aspects (inflation, GDP growth etc).

The first is the rate of price growth where contract should state salary increase in line with inflation in the country.
\[ W = f(w, CPI) \]

The second argument is the average salary in country where the current salary structure depends upon GDP growth and rise in salaries as whole.

\[ W = f \left( GDP; W \ average \right) \]

Since now reasoning was in line with current structure of thinking, and praxis that is usually present in mid to high income countries. Bangladesh have however possibility to rise salaries in sector as function of \( w = f(profit; \ average \ salary \ world; \ average \ salary \ country \ origin) \) but while sector wages are above national average international capital do not recognize the variables related to the business that are valid on corporate scene and try to keep the wages on the national average level which is far below average salaries in developing or develop world.

In that case workers alone cannot change the process of negotiation but need the help of Unions that could negotiate their stand in front of Employer and realize impacts of taxes and Government decisions about different problems.

<table>
<thead>
<tr>
<th>Union Actions</th>
<th>Advantage</th>
<th>Disadvantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculate production process</td>
<td>Have all aspects of jobs clearly and understandable presented</td>
<td>Cannot observe all costs benefits, are partial to some point</td>
</tr>
<tr>
<td>Demand better working condition</td>
<td>Have more satisfied workers, better working for all workers</td>
<td>Do not fight for all workers only for those in Union, do not realize danger of each working place, change come with ages but this lowers salaries</td>
</tr>
<tr>
<td>Negotiate with government to incorporate their need in the Law structure</td>
<td>Government can influence worker standard by Legislation, tax regulation, allowing ESOP, inducing better working condition through various tax brackets</td>
<td>Government has increasing demands for taxes and this is the only array that influences Investor decisions. Rising taxes means that all other institutional needs of workers are satisfied (hospitals, schools, legislation etc.)</td>
</tr>
<tr>
<td>Topic</td>
<td>Details</td>
<td>Details</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Be aware of international legislation regarding working conditions</td>
<td>It is of benefit to be aware of international standards that are present in the world, induce some basic measures that need to be incorporated in standard of all workers in the world</td>
<td>Each country have own specific facts, and some minimum standards that are presented in World legislation do not protect worker on specific type of job</td>
</tr>
<tr>
<td>Be aware of international legislation regarding environmental protection</td>
<td>Basic measures for environmental protection are laid down and basic structure need to be respected by all investors in the world</td>
<td>Some specific measures are not met; International regulation are not firmly supported by Law in country</td>
</tr>
<tr>
<td>Act united and with clear purpose</td>
<td>United workers and Union can achieve better results, can impose negotiating power more easily clearly</td>
<td>Sometimes even two unions, independent workers can show diversification and additional negotiating power, proving some democratic means in their behavior</td>
</tr>
</tbody>
</table>
Since it is a forbidden in western economies for child to be employed – reasoning of workers and their status is compared with playground toys. This and school need to be part of child growing up time, and not constrained work time with end result of salary of $10/month.

Workers position is to some extend similar to slide reasoning. Very steep –b- part of equation is the one that presents education and finding a job. Once a job activities have started a worker slides till ground until retirement on the –c- part. On this path his physical strength weakens - what is in Bangladesh case of food production or manufacturing of textile a hinders. –N- presents potential to move to another position another slide inside the same or other company. –mg- force that shows downturns of his activities -in a case of Bangladesh a work with low payments, no wage rises, children input in job activities. –mg cos α – is his activities united with Worker Union – guarantee of certain rights, lunch, pension fund, potential for worker to be involved in ownership schemes etc.
2.2. CHANGE COMES FROM INVESTOR

To rise a wage as a consequence of investor decisions is a rarely the case. Not for all and not significantly. However this possibility still exists and is present if:

A) -Workers are not doing quality jobs at large scale

B) -Workers do have certain rights from primary contract and profits on international markets are rising significantly

C) - New investor came and educated personnel is offered/ given bigger salary. Exist possibility to lose all/the most productive work force.

D) - Some additional health hazards are causing greater risk to employees and employer in that respect bigger salary is offered to improve performance and prevent some dangers

-etc.

A)

Consider following investor aim:

End job (quantity, quality)

\[ \text{Profit} = \text{Price} \times \text{Product (Quantity, Quality)} - \text{Cost} \]

\[ d\text{Profit} = \text{Profit} - \text{Profit}_{t-1} \] as Earnings- in form of retained earnings or dividends payouts.

when dProfit decreases over more than two to three years Price and Product must be careful examined. It is lesson from economic crises that two years after crises the majority of lands went in recession period but they bounced back. If the three years period prolonged than sources of problem must be in the way how the business is done and each factor that determines the product position on the market.

If the salary is bound to quantity workers in desire to earn more can offer lower quality works. In that case new contract with better terms can be offered.
\[
\sum \text{Profit Total} = a + \sum \text{Profit}_1 (\text{labor effort}_1, \text{quality}_1) + \sum \text{Profit}_2 (\text{labor effort}_2, \text{quality}_2) + \sum \text{Profit}_3 (\text{labor effort}_3, \text{quality}_3) + e
\]

If

\[
\sum \text{Profit Expected} < \sum \text{Profit Realized}
\]

\[\sum \text{Cost of moving factory} > \sum \text{Cost of rising salary, new contract}\]

under standard conditions of wage formula, Investor is willing to start negotiating process with workers to induce better quality, more products in their production process.

B)

Some basic formula and investor willingness to cooperate and reward accomplishment in the field of quantity, quality production may produce further expansion of workers supply of end products: innovative measures in production, some design, style suggestions, profit increased and satisfaction overall increase.

\[
\text{Wage} = a + b_1 \cdot \text{quantity pieces} + b_2 \cdot \text{quality pieces} + b_3 \cdot \text{new design} + b_4 \cdot \text{new ways of production} + b_5 \cdot \text{savings of material} + b_6 \cdot \text{savings of working process} + e
\]

This kind of relationship and good reward strategy that actually have positive impact on workers and Investor can further contribute to building a wage structure.

In this case, wage formula need to be tied up with company overall performance—on international scale and than average salary in country would not be boundary force that can not be overpassed by workers or investor.

\[
\text{Wage}_t = \text{Wage}_{t-1} + f (\text{Profit}_{t-1}) + f (\text{Profit}_{t-2}) + f (\text{Profit}_{t-3}) + \sum \frac{(R-C)(1-t)}{(1+r)^n} \text{expected}
\]
If new company comes on the area of production and offers new wage opportunity than is the original investor in position to reconsider current wage status.

<table>
<thead>
<tr>
<th>New investor:</th>
<th>Both increase wage at the same level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional conditions are changed but salary is the same</td>
<td>Workers will go to new investor but only in small rate</td>
</tr>
<tr>
<td>Part of workers go, some stays.</td>
<td>Wage is increased bit no additional standards</td>
</tr>
<tr>
<td>Old investor do not change position</td>
<td>improved-worker will stay with new potential to further negotiations</td>
</tr>
<tr>
<td>Workers will go to new place to find better working conditions and rise of salary</td>
<td></td>
</tr>
</tbody>
</table>

Some reasoning from both old/new investor is presented:

New investor offers a better working conditions and bigger salary in order to attract the best, the more creative, productive and already educated working force.

\[ W_{end\ wage\ worker} = W_{1\ wage\ base} + W_{2\ wage\ new\ investor} + e \]

It can be done until work force do not come in quantity he needs, until he reach some average national salary or his profit margin is not in line with cost increasing.

To defend current position old investor have to follow the new conditions, and even offer some new improved measures in business or further worker participation in process.

\[ W_{old\ investor} = f (higher\ salary,\ improved\ condition,\ salary\ above\ national\ average,\ ESOP,\ bigger\ pension\ fund\ etc.) \]
D)

To prevent lower profit from increasing number of accidents that happened due to increase effort from worker and lower attention to machine, detail in work process investor may himself induce stricter working conditions.

They usually are a relation of

\[ W_{\text{condition}} = a + b_1 \times \text{imposed frequency of breaks} + b_2 \times \text{time of breaks in process} + b_3 \times \text{maximum number of hours worked in day} + b_4 \times \text{maximum hours at work in week} + b_5 \times \text{obligatory protection measures} + b_6 \times \text{different danger groups} + \epsilon \]

As the profit is inversely related to number of injuries the additional cost of insurance need to be put in place. That why investor calculates:

Profit 1 = f1 ( wage increase, better working condition, minimum insurance contracts)

Profit 2 = f2 ( wage the same, lower working conditions, maximum insurance contract)

He reasons between two processes and usually determines on the measure of

Investor decision = f ( Profit_{\text{max}}, \text{Number of injuries the lowest} )
Again this line of decision making process can be placed on playground.

The kindergarten facility that is the most comparable with changes inside the company structure on the benefits for workers is carrousel.

It implies necessity for work $W$, (physical or intellectual) once the carrousel is made.

Combines property of position of carrousel (busy place, near kindergarten, in park, on lonely place), cost of construction, how many children manage the carrousel and how they are coordinated in one common aim to go in direction they all think is suitable: left or right.

*where*

Dimension of carrousel $= 2*r*\pi$

$R$ = line of command from top management to last worker, clarity of process, intention, reward etc

Once when starts it follows parts (velocity, direction, child power change etc)

Total work of one group of children $W_1 = (2*r*\pi)*v_1 + (2*r*\pi)*v_2 + (2*r*\pi)*v_3 + e$

Many children can play on this toy (in factory 2 sometimes 3 shifts)

Total Work $= w_1 + w_2 + w_3 + e$
2.3. CHANGE COMES FROM GOVERNMENT

Government in the country through various measures can induce growth of foreign investment, hinder further expansion of foreign capital and influence position of workers. Through tax policy it creates position of attraction or repelling for capital, and stability in whole system brings additional value to capital. In process of Government influence future perspective and plans for tax policies rate considered, as well as usage of money: is it used to improve standard in form of educational institutions, hospitals, etc or used for other projects. How will possibility of further tax increase policy influence position of children, workers in country.

a) Tax on profit in country is increased

Again profit is in relation with revenue and cost deduced for tax rate. If tax rate is increased profit shrinks and investor have to calculate followings:

\[
\text{Profit}_1 = (\text{Revenue}_1 - \text{Cost}_1) \times (1-\text{Tax}_{\text{base}})
\]

Where

\[
\text{Profit}_2 = (\text{Revenue}_1 - \text{Cost}_1) \times (1-\text{Tax}_{\text{new}})
\]

\[S = \text{Profit}_1 - \text{Profit}_2\]

Investor will consider followings

\[
\text{Profit}_1 = (\text{Revenue}_1 - \text{Cost}_1) \times \text{workers} \times (\text{Revenue} - \text{Cost})\text{market domestic} + (\text{Revenue} - \text{Cost})\text{market foreign}) \times (1-\text{Tax}_{\text{base}})
\]

\[
\text{Profit}_2 = (\text{Revenue}_1 - \text{Cost}_1) \times \text{workers} \times (\text{Revenue}_2 - \text{Cost}_2) \times (\text{Revenue}_3 - \text{Cost}_3 \text{ energy}) \times (1-\text{Tax}_{\text{new}})
\]

If \(\text{Profit}_2 > \text{Profit}_1\) Investor may think about wage increase, improving some additional conditions to workers

If \(\text{Profit}_2 < \text{Profit}_1\) Investor calculates further cost decrease or cost of production in more favorable conditions.
b) Tax difference

Government can pursue one policy for Tax on profit and totally opposite policy on Tax on labor. It is important to stress that whatever conditions exist now there is a possibility to change either if Government changes or some other macroeconomic situation in country requires different tax rates.

Tax stability usually brings new investors, potentials to further development, stability, long term prospects, planning, and current level of investment potential of existing Government structure.

Instability or constant change of Laws that implies different tax systems brings uncertainties to new investors, constant vigilance of existing investors, volatility in investments inside country and vague process of future investment opportunities.

Decisions are based about Government Budget, Plans, and Prospects and also relate to:

\[
\text{Government decision} = f ( \text{tax rate, tax rates, velocity of change, usage of capital, agreement with investor about possible involvement in investment projects etc.)}
\]

\[
\text{Government decision 1} = f(\text{attract investor}) = f(\text{low tax on profit, stability, low velocity of tax change, arrangements to build add infrastructure -roads, social involvement, lower tax rate on labor etc})
\]

\[
\text{Government decision 2} = f(\text{have large number of investors}) = f(\text{increase tax on profit, stability, constant velocity of tax change, no requirements of potential to influence additional infrastructure -roads, higher tax rate on labor etc})
\]

\[
\text{Government decision 3} = f(\text{concentrated on infrastructure project, highest amount of tax before investor moves to another country}) = f(\text{increase tax on profit, stability, constant velocity of tax change, no requirements of potential to influence additional infrastructure -roads, higher tax rate on labor etc})
\]
In the still stand Potential energy is \( E_{pot} = h \cdot g \cdot m \)

That is depends upon height that swings is put, mass of a child or government, and gravitational force of Earth.

The moment energy and velocity is given to a process swings moves and reach a certain point after moves back. It can be presented as tax policy that is put in force and swing back usage of that money. To some extend the move forward is a process of collection a money and back negative process of spending money. Each can be made with more strength, with wind in face or back in the process. If the swings goes faster tax policy changes with increase tax rates – as in case of Bangladesh- but usage of that money need to follow this policy equally - building schools, educational institutions, hospitals, kindergartens etc. This process is presented as negative (short run) spending of money also have long term positive impacts where

More schools \( \rightarrow \) More educated work force \( \rightarrow \) High salaries, taxes
2.4. CHANGE COMES FROM REGION

Changes in region comes from (again) main equations and economic variables which are further influenced by regional government policies toward taxation, education, working condition and willingness to cooperate, regional competitiveness, some transportation, energy advances etc.

\[ C_1 = k + bY + b_F + e \]

Consumption in country 1 is determined with the income in country, marginal propensity to save or invest.

It is also determined from the income of neighboring states where population can cross border and buy cheaper goods, or find employment.

\[ C_1 = k + b_1Y_{\text{income in country}} + b_2Y_{\text{income in countries in region}} + e \]

Population will come and purchase the good if the price is lower or at competitive rate in their own countries in that way reducing consumption power of their own country.

\[ C_2 = k_2 + bY_{\text{income in country}} - b_2Y_{\text{income spend in neighboring country}} + e \]

On the side of employment is different process if we assume there are no legal barriers to enter. In the first country where the good is more cheaply people have lower wages and tend to find employment in neighboring countries.

\[ Y_1 = k + b_2Y_1 - b_3Y_2 \text{ lost due to emigration} + e \]

\[ Y_2 = k + b_2Y_1 + b_3Y_2 \text{ gain due to new workforce} + e \]

This process is continued until some form of equilibrium is regained or some third factor introduced in equation.

The third factor can be in form of energy potential, import, export of energy resources which impact additionally the whole process.
Government policy adds to reasoning in the way to attract the first move from investor.

Investor at first reasons tax policy overall and make preferences over countries of investment

\[(R-C)_1 \times (1-T\text{ overall })_1 > (R-C)_2 \times (1-T\text{ overall })_2\]

With a lower tax rate and lower cost of working force investor decides for country where bigger profit is made.

If different conditions regarding the work force and tax are met calculates on this kind of process

\[((R-C_{\text{Tax wage}} - C_{\text{wage}} - C_{\text{energy}} - C_{\text{other}})) \times (1-T\text{ profit }) > ((R-C_{\text{Tax wage}} - C_{\text{wage}} - C_{\text{energy}} - C_{\text{other}})) \times (1-T\text{ profit })\]

While the neighboring countries would like to attract investor rational government would decrease tax rates. In that case capital came in but workers are faced with lower wages. If other barriers exist to entrance new investor decide to invest in new country with higher tax rates for profit making savings on other costs such as advertisement transport cost and in that way position of employees can stay the same. In that case workers face the same wage and treatment and this are for them lose loose strategy and for the investors and government win-win strategy.

<table>
<thead>
<tr>
<th>Country</th>
<th>Tax on wage</th>
<th>Employees</th>
<th>Government</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>High cost on employees could mean lower educational effort from investor, lower other benefits, reduced. It is not determined solely on taxes (profit on the market determines also workers position)</td>
<td>If imposing higher than average in region tax rate should build more schools, kindergartens and invest money in socially needed institutions (hospitals, parks, animal protection) As well only higher rates do not imply end efficiency</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>Lower tax rate do not guarantee better working conditions, but opens way to negotiate about bigger salaries. It further depends upon strength of Union and profit on the market overall not just in the country</td>
<td>Lower taxes means that Government want to attract investors, and expects from investor to bring additional benefits to country: involvement in infrastructure projects, bring growth in employment overall, educate workers etc.</td>
</tr>
<tr>
<td>Country</td>
<td>Tax on profit</td>
<td>Employees</td>
<td>Government</td>
</tr>
<tr>
<td>---------</td>
<td>--------------</td>
<td>-----------</td>
<td>------------</td>
</tr>
<tr>
<td>Country\textsubscript{1}</td>
<td>10</td>
<td>Lower expectation of employees to bring additional benefits—schools, road, lunch, -by investor as part of business process in community</td>
<td>Higher tax on profit means that government is not so keen on attracting foreign investors</td>
</tr>
<tr>
<td>Country\textsubscript{2}</td>
<td>5</td>
<td>Higher potential to employees additional way to have extra infrastructure, or poverty of great kind that no result in negotiations can be produced from investor</td>
<td>Great potential to new investors—but should be careful if it is a word about stable country, or hidden intention about possible tax hike in future once investment is made</td>
</tr>
</tbody>
</table>

Some possibilities:

Government decides about taxes (Tax on wage, Tax on profit)

<table>
<thead>
<tr>
<th>(5,15)</th>
<th>(10,10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower tax on employees means that union is strong and has agreed to compensate workers with additional benefits. Wage increase, environmental health protection measures, education, building kindergartens etc. Tax of profit is increased while there is no ESOP in smallest degree; profit is taken outside the country.</td>
<td>Government tries to find a golden way or a middle road. It can be of benefit if other countries have much higher rates, or it’s satisfied with current investment rate. It shows that much of the burden for social infrastructure will be done by government</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(20,10)</th>
<th>(15,5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest amount of tax burden to investor; Already enough of foreign investors in country; Have plans to builds infrastructure; Could not agree about other benefits to workers (health protection, wage on work effort etc.); Do not have good communication with Unions or Unions with Investor</td>
<td>Government wants to attract new investors so keep the tax on profit lower. Would like that some part of profit stays in land for future investment. Do not impose additional burden on investor regarding work condition; Infrastructure plans inside government Jurisdiction</td>
</tr>
</tbody>
</table>
### Employees (Tax on wage, Tax on profit)

<table>
<thead>
<tr>
<th>(5,15)</th>
<th>Lower tax rate on employees can mean that country suffers from high unemployment rate, jobs are of low value, easily replicable, etc.</th>
<th>Tax on employees could mean that employees are relatively paid but not all necessary effort is taken into consideration. If further rates hikes investor could pull out without obligation to compensate workers.</th>
<th>(10,10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(20,10)</td>
<td>Highest tax rates can mean protection of workers, but do not guarantee that this tax will be used for social infrastructure in country or good in pension funds</td>
<td>Employees are taxed while investor is not intending to bring additional infrastructure in the land,</td>
<td>(15,5)</td>
</tr>
</tbody>
</table>

### Investor (Tax on wage, Tax on profit)

<table>
<thead>
<tr>
<th>(5,15)</th>
<th>Investor is attracted with lower tax rate on wage. If the production requires large number of employees he will seriously consider country as choice</th>
<th>Middle road is usually applied in countries that already have production in place. Can attract investor who with additional advantages such as transport routs, other lower costs (energy). It can hide danger of further tax increases.</th>
<th>(10,10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(20,10)</td>
<td>Worst possible case for investor But at this stage he is not obliged to meet additional requirement for some social infrastructure</td>
<td>Lower tax on profit is a sign that investments are needed and workers potential requirements met by paying a higher tax on wages. In this case investor will probably try to leave profit in country but offering additional reward to employees</td>
<td>(15,5)</td>
</tr>
</tbody>
</table>
As shown end results between countries in region is a summary of many factors that are offered as input on the side of investor, employees and government as basis. Without cooperation between countries end sum is negative in all respect out of which low environmental protection is the most visible one.

Only profit and short term insight into cooperation brings only maximization of profit for the most strongest in the game.

To recognize full scale of cooperation and influence all negative aspects need to be taken into consideration: lacking the right of employees, having children as a potential work force, or not investing into environmental protection etc.
After all negative potential of old game are recognized new game starts with more favorable results for all three parties:

For the region this reasoning is following:

**a) Worst case scenario**

Finding a country that have the lowest rate of taxes for investor to come.

Low end price attracts customers from region but low working conditions with current low tax and low wage do not promise a better employment opportunities. With low tax rates investor stays in country offering the same average under average salaries and the whole region plunges further into poverty.
b) Region with similar conditions

Each country in region have similar conditions regarding the labor tax policy and equal opportunities to transport goods in other parts of the world. Investors equally share opportunity and invest proportionally in each country. Positive fact is that investment rises employment rate but end result is also invisible and result of game theory.

If each investor tries to keep advantage on end market undercutting cost in country of production whole region is again put pressure to keep wages low.

But if one investor in country 1 rises wages a little, consumption power of population rises, employment starts to be of prospect and country 1 country 2 workers tend to increase their potential either through renegotiating in their countries or moving to country 1. For investor and government in countries 2 and 3 this is a problem and they can decide either to lower taxes or to increase wages. In this case good positive results on work force are made.
c) Best case scenario

The best scenario depends from country to country, but each have favorable end results: increased wages, improved working conditions, low rate of accidents at work, no child labor, involvement of employees in ownership structure etc.

It is a common work of workers, union, investor, government and social community that should clearly state preferences and aims of further development and rise of society.

This process is not straightforward linear line- but is a process of analysis, construction, further negotiation, constant alert to all changes in the region and world.
2.5. CHANGE COMES FROM ANOTHER INVESTOR

Good production results, excellent profits and experienced workers in the field can be the fact to attract new investor to come to Bangladesh and open the factory. Again he calculates again and again process of production, transport end market to reach the final aim: selling the good and increasing market share.

His calculation can be than based on reasoning of some other comparative advantage that in in end formula for prices.

\[ \text{Price} \times \text{Quantity} = \text{Good Produced (labor, materials, energy)} + \text{Transport (km, costs)} + \text{Market overhead} + e \]

In other words

\[ A = B + C + D \]

For the new investor to come in land of already established producer is a game changing strategy where he needs to put some advantages over competitor.

In the second investor entrance B is usually higher while offering bigger wages to workers wanting to attract experienced and good workers in his production process, market overhead depends upon market it sells and are changeable – if it is a new investor than this D is the same as the original investor and C transport cost have to decrease in order for him to reach competitive advantage non the market.

For this kind of reasoning new investor will chose markets on domestic ground-Asia, Australia, China, India, or nearby Saudi Arabia and Russia.

In that respect new investor will have price of end good competitive with western counterparts and after conquering domestic markets in Asia Russia may even want to open subsidiaries in traditionally first investor markets.

Having established large production facilities the first investor would try to keep an eye on the all relevant facts that means market price and sources of production and try to hinder entrance of the second investor in much way.
The first is to give a counter offer: he also raises salaries to workers giving them additional benefits in order to keep doing a job as it is done since moment of the first signal of new entrants.

In that respect

![Diagram](image)

In classical economy case is usually presented in number of end profit and market share potentials.

![Diagram](image)

This game is not so simple as it looks while involves many other factors such as:

- Potential of first investor to expand production facilities, much reduced cost from production due to economies of scale, current knowledge and infrastructure about production sites, material purchase, possibilities of workers experience
These additional advantages however do have boundaries in classical economics and in new market reasoning.

Classical economics says that the best advantage is at the point of lowest long term marginal curve. 

Picture – Variation in scale

LTC (p,y)

LMC  LAC
LMC= \( (p_k+a K)(r+y)/ f k(K,L) =w/f \) (K, L)

\[ \frac{\partial F}{\partial L} = \frac{p t f c-w}{(1+r)} \]

\[ t=0 \]

\[ \frac{\partial F}{\partial K} = \frac{p f k}{(1+r)} - a t + a t+1 (1-y) =0 \]

\[ \frac{\partial F}{\partial I} = - \frac{p k + a I t}{(1+r)^{1} + a t+1} \]

New entrants can try to improve his position on the production market by deterring barriers of entrance by having additional advantage over competitors:

- Offer price of energy (electricity, gas, oil) at lower than market cost
- Have investment in special machine’s that saves energy, have a lower emissions, production clothes of better quality
- Offer better wages and education to people - but these educational advances can be used only in company on particular machines
- Build additional infrastructure project – ship port, airport, ship yard for transporting goods on end place
- Involved in building infrastructure project in place of production-schools, kindergartens etc.

In these respect barriers of entry lowers, price and quantity games with current producer start to change:

\[ \text{Po f}(x)^{+} + \sum_{i} \pi q i (x) < \text{Po f}(x)^{+} + \sum_{i} \pi q i (x) < \text{Po f}(x) + \sum_{i} \pi q i (x) \]

Where end game is demand on local and world markets.

In respect of entrant that comes from Russia demand is determined as demand at local markets South East Asia, Demand at home market, and at the current investor demand at local market and North America, Europe as markets

\[ L(x_1...x_n)= f(x_1...x_n) - y (a_1+x_1+a_2+x_2-b) \]

In that respect new investor is fighting for the market at home, production facilities, potential new markets and security of future jobs in selling market.
So current Investment is relationship of.

\[ NPV = -I \text{ capital} - I \text{ labor} - I \text{ infrastructure project} + I \text{ new technologies} + \sum_{i}^{n} \frac{(R-C) \text{direct investment}}{(1+r)^n} + \]

\[ + \sum_{i}^{n} \frac{(R-C) \text{market domestic}}{(1+v)^n} + \sum_{i}^{n} \frac{(R-C) \text{potential market}}{(1+h)^s} + e \]

Investor from Russia can have additional motive while having a child labor in neighborhood what hinders growth and creativity in his country also. If he continues with game of low wages, and low support to positive change no additional benefit would bring to Bangladesh, region or even his country although at first it may look like good investment opportunity. Only balanced game with first investor that constantly worked on improving conditions for worker in country of production can bring future benefits in production and seller markets.

<table>
<thead>
<tr>
<th>Strategy1: Both keep wages under country average</th>
<th>First investor</th>
<th>The Second Investor</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both collude</td>
<td>Initial investment, already established conditions with workers govern Collude with second investor</td>
<td>Collude with first investor; Keep the wages down;</td>
<td>The worst case scenario for region and country of production. In long run for investor country itself</td>
</tr>
</tbody>
</table>

| Strategy2: The second investor rises opportunity only to point where first investor loses workers, domestic market, | Keep the initial condition, have secure selling market at current profit margin | Have a little bit more cost of production- but have potential to increase market share. Defend domestic market; | A little bit better conditions at first for workers in new company. Not good in the long run—if all other things the same—for anybody |

| Strategy3: Both rises wages in line with profit inflation potentials, respect of workers | Improve worker conditions, rise wages on world scale | Improve workers conditions, | Win win situation for workers investor and government. World is in new balance |
2.6. CHANGE COMES FROM INTERNATIONAL ORGANISATIONS

International organization measure, monitor and report in various statistical reports situation that is related to work, work conditions and especially children involved in business activities. Although sums of money are allocated to monitoring process this is not enough and more serious campaign against abuse of children need to be overtaken.

Although international organization do have a fund that would bring actions against child labor and child trafficking still a large number of children are involved in labor with minimum pay. The reason for their activities is poverty, illiteracy in family, break ups, lack of knowledge by guardians or parents etc. Although Bangladesh ratified Minimum Age Convention (C138) ILO (World Forms of Child Labor Convention (182) result are far from good in Bangladesh.

Work of children can be reduced to lower or non-rate with a help of international organization on following types of reasoning’s:

- *Marketing*

- *Taxes*

- *Fines*

- *Export veto*

Etc.

Marketing is done at the side of overhead costs, where promotion of goods do stresses importance of children, obligation of adult to provide means for school whether children comes from families or do not have enough resources to support all the members and stress the fact that this garment is not produced by children.

This action can be part of every season fashion shows, incorporated in logos of companies, be as placate on the markets and is no additional extra cost besides current structure of overheads. If some additional market advantages desires to be obtained and some previous connection with worker abuse experienced than additional advertisement can support current and future company orientation.
\[(R-C) q = (R-C \text{ adult workers}) q + (R-C \text{ other direct}) q + (R-C \text{ transport}) q + (R-C \text{ overhead}) q\]

\[(R-C \text{ overhead}) q = R - (\text{cost of managers, cost of selling the product direct, cost of marketing classical} - \text{Cost of marketing stress on worker position and policy of no child labor})\]

This is the case where work of international organization through monitoring obtained results and company actually realize how big damage to future businesses can have.

In the case that agreement is done but no actually improvement is made on the field possibilities of extra fines and taxes need to be incorporate in international law and signed by countries most vulnerable to this can of work child exploitation.

In that case revenue would fall drastically for company in direct but also in indirect was leading to following equation:

\[(R_{\text{new}} - C_{\text{new}}) (1-T) = (R_{\text{old}} - C_{\text{old}}) (1-T_{\text{regular}}) - R_{\text{decreased competition}} - (1-\text{Fines})\]

Export veto hasn’t occurred since now and only governments in market countries can have a certain authorities to start measures in that direction. It could be made only if production in local economies is supported but since internationalization of business is widely present it is more probable that measures such as work with international organization will be more supported than drastically measures for import ban.

In that case revenue side of equation would decrease drastically and company would have to change the child labor policy because it proves to be too expensive. Although it can search for new markets having revenue from selling the products in local markets in Asia, some opening a new markets in South America or countries of eastern Europe Russia, even Africa- but at this point revenue will be smaller due to not only lower end price of product, but due to higher transport costs, and opening a brand new selling places. In the long run process of this kind would stabilize.
3. BANGLADESH STATISTICS

On the land of 130,000 sq km almost 70% is agricultural property and around 60% arable. Forest area is around 10% of total land. Food production rises significantly each year around 2490 kg/ha what brings the country good revenue expectations from rice, juta, sugar crops, fruit, potato, garlic, etc production.

Land

![Picture 3](Picture 3)

**Picture 3**

![Picture 4](Picture 4)

**Picture 4**
Very large import of wheat, palm oil, maize, peas is still present making exporters of these commodities potential partners in common investment projects.

Imports 2010

Picture 6
Export is strong in fruit, juta, vegetable, etc commodities out of which tobacco have one of the highest unit value per tone.

Export 2010

Although growing economy with strong results in agriculture and manufacturing Bangladesh is still very poor country with high amount of social needs and programs.
Imports of goods and services rose from 2005 and 14.5 billion USD to 37.66 billion USD in 2012 which is an increase of 258%. Export followed this trend but with a lower starting endpoint where exports in 2005 were 10.6 billion USD and in 2012 27.5 billion USD which is an increase of 264%. Unfavourable conditions were noted in the service sector where imports (2012/2005) rose 240% and export only to 196% to reach 2.6 billion USD.

![Bar chart showing trends in imports, exports, and aid flows from 2005 to 2012.](Picture 9)

Net bilateral aid flows is the largest from Canada 102 million USD in 1990 to decrease to 61 million USD in 2011; than from UK that in 1990 gave 97 million USD to increase amount to 368 million USD, Japan decrease help from 373 million USD in 1990 to 67 million USD in 2011; EU increase aid from 58 million USD in 1990 to 159 million USD in 2011 etc.
Large exponential increase of Stock Trading was marked in period after 1998 where in 2007 stock traded were in value of 4,8 bill USD, in 2008 9,2 bill USD, while in 2012 12,5 bill USD what is significant rise in that sector. Total value of stock traded in 1990 was 0,02 % of GDP to be around 10 % of GDP in 2008 and 2012 with even higher amounts in 2009-2011.

Significant rise in that sector. Total value of stock traded in 1990 was 0,02 % of GDP to be around 10 % of GDP in 2008 and 2012 with even higher amounts in 2009-2011.

Picture I

Picture II

Picture 10
Opposite trend is marked in current account balance where 2011 had negative measure of -0.14% of GDP and in 2012 current account balance grew to 2.29% of GDP.

Foreign direct investment grew from 3 mil USD in 1990 to over 1 bill USD in 2008 and 2011 what is 1% of GDP.
Strong force to GDP growth was given by agricultural sector where in 1990 one worker produced quantity of value added of 244 $ to be increased to 489 $ in 2012.
With rising production in agricultural and manufacturing sector larger quantities of emissions and wastes are produced bringing further dangers to environment and living conditions.
On this large production process that is going on in Bangladesh points dana about electricity production that rose more than 600%. In 1990 electricity produced from gas was 6,45 bil kWh and in 2011 40 bill kWh, electricity from oil in 1990 was 333 mil kWh and in 2011 2 bill kWh, and total production rose from 7,7 bil kWh to amazing 44 bil kWh in 2011.

In that respect rose GDP per unit of energy use which in 1990 was 4,4 $/kg of oil equiv) and in 2011 8,5 $/kgoe of energy used.
Good news for country however is that energy import remained in boundaries of around 15% of total energy use in the whole period of significant production rise.

Almost linear connection is to be expected in relation between total electric consumption and electric consumption per capita.
Warries in the future can come from emission part of equation and more energy efficiency measures will be probably required – more renewable energy etc.
By far the largest source of CO₂ emissions comes from electric and heat production and this is the place where the most attention to clean technologies can be put on. Rising emissions from transport implies not just rising standard and GDP rise but future project of common transport measures with more cleaner technologies.

*Picture 25*

*Picture 26*
Population density rose from 824 to 1124 per sq km of land and this brings additional attention to housing, investment project on rising population number.

**Picture 27**

**Picture 28**
Large difference between deposit interest and lending rate in majority of observed period implies high country risk, strong banking influence, and negative prospect for small investor who faces high interest. This trend is decreasing and in 2012 there is small difference between rates. While base interest is still above 10% still large risk of country is present. Probably will decrease as GDP continues to growth, and country further gains on stability.
Very vivid picture of tax rates implies changing structure where in 2001 15.9% of GDP came in form from tax payment to be increased in 2011 to 9.9% of total revenue. It is important to stress that tax on income, profit, capital gains rose from 15.9% in 2001 to 27.6 in 2011 of total tax payment.

*Picture 31*

*Taxes on goods and services (% of revenue)*

*Taxes on goods and services (% value added of industry and services)*

*Taxes on international trade (% of revenue)*

*Other taxes (% of revenue)*

*Tax revenue (% of GDP)*

*Taxes on income, profits and capital gains (% of revenue)*

*Taxes on income, profits and capital gains (% of total taxes)*
With rising foreign investment, export from agricultural and manufactured products country is more and more involved with standard systems of certifications to reach further investment potentials. Number of patents, innovations and scientific papers is also on rise.
Very large increase in air transport was marked in period from 1994-2006 reaching values to 190 million ton km, in 2012 however it was only 119 million ton km.

Relway trasport also reached local peak in 2003/2004 with 951 million ton km to reach in 2012 710 million ton km.
This transport relation is adversely related to expenditure process that in period from 2012/2005 rose 190 %. General governmnet final consumption reached 6 bill USD; household final expenditure reached 91 bill USD, and gross national expenditure rose to 127 bill USD all in trend that took exponential form.

![Picture 40](image)

*General government final consumption expenditure (current US$)*

*Household final consumption expenditure, etc. (current US$)*

*Final consumption expenditure, etc. (current US$)*

*Gross national expenditure (current US$)*

*Exports of goods and services (current US$)*

*Gross fixed capital formation (current US$)*

*Imports of goods and services (current US$)*

*External balance on goods and services (current US$)*

The same percentage marked 2012/2005 Gross fixed capital formation 198 % rise, export of goods and services rose to 289 %, import rose to 293 %, external balance (negative) rose to 306 % in 2012/2005 period.
Remarkable is also strong growth in trade as percentage of GDP that rose from 20% in 1990 to 60% in 2012.

In that respect services had a most significant part that rose from 14 bill USD to 40 bill USD in 2012. Agriculture value added rose from 8.8 bill USD in 1990 to 19.5 bill USD in 2012, industry value added was 6.2 bill USD in 1990 to reach 31.8 bill USD in 2012, and manufacturing value added rose from 3.8 bill USD in 1990 to 19.7 bill USD in 2012.
Savings followed that trend but with slower phase rising from 16% of GNI in 1990 to 33.4% of GNI in 2012.
This Results points out at very strong growth of GDP and GDP/capita especially in period after 2002. In 1990 GDP /capita was 280 USD and in 2012 747 USD. It is still very far away from average of EU, or USA where countries have more than 20 000 USD/capita reaching 3.7% of average GDP/capita in western economies.
It was to expected that input in industrial and agricultural sector would bring additional tax requirements, but on this side of equation more important is the fact is the tax money used to prevent child labour, improve working conditions in companies, improve some negotiating power with investments from abroad, build additional infrastructure: schools, hospitals, sanitation, roads etc.
As in case of GDP growth social improvements are better but far away from results from average mid income economies. Literacy rates improved but is still under 100 for youngs 15-24 years old.
Picture 58

Picture 59
Very large degree of child employment in agriculture sector both female and male in the age from 7-14 still exist. The large number of them are employed in family or village farms and have both school and jobs obligations.
Very disturbing fact is that very large percentage of children work in manufacturing and service sectors missing schools, or not going at school at all.
It is of high significance to closely monitor merchandise export in areas around the world: potential markets of South America, other developing countries, keep in phase with current trend to export goods to high income economies with proper strategy of wage rise.

Picture 79

Picture 80
Potential for high technology production and export exist - although it seems hard to achieve results from Japan, Korea, China. If some parts or reorganisation is done on Far East, promoting regional growth and better trading conditions for goods, agricultural and textile goods can be reached here.

![High-technology exports (current US$)](image)

*Picture 81*
4. CONCLUSION

Very hard time in changing current payment conditions by workers in Bangladesh that is far below average world price is tried to be tackled and solved by this paper. Although several strategies are proposed it is highly likely that all are needed in the best mood situation from all parts in process of rising standard, banning the child labor and improving working conditions in Bangladesh and region as whole.

Although GDP grows in recent years as a consequence of high level of agriculture and manufacturing production, it is mainly done by cheap labor from country that puts its efforts in world trade where profits are not collected by end user or worker in country of origin. The high barriers to loans with high interest rates prevents local people from establishing production with domestic owners and this situation can be solved by agreement with current investor to allow participation ESOP to some extend for his workers. If this is not possible than barriers of enter for new investor from region of continent should be lowered or government promote state bank with lower interest rates with end aim workers participation in ownership and work process as well.

High production, low wages, increasing GDP, increased energy usage point out on larger emissions that could besides monsoon problems bring environmental damages and additional problems to region. High mounting of Tibet with melting snow from one side, and Indian Ocean as source of flooding’s can influence large negative impacts on agriculture and population as whole. Without wage rise, proper protection that implied new modern architecture, large transport systems build as infrastructure projects from Government that provoke less emissions, each person aware of problems and acting at best interest for himself and nature as one, new problems will appear with high likelihood.

Wage rise, children that are busying in school instead in factories or fields is just the first step in struggle for decent human living. Aim is however greater : keeping and taking care of the whole system in nature- humans, animals and nature itself in region that connects the highest mounting of Tibet and the lowest sea levels far away in Pacific ocean.
Literature:

www.worldbank.org

www.fao.org

www.un.org

Bangladesh Statistic Burro

Microeconomics, University of London SOAS

www.repec.org/Bangladesh

Www.ideas.org/Banglades

www.wikipedia.org
Crop production cereal yield strong rising connection
Ordinary Least Squares Estimation

Dependent variable is GG

22 observations used for estimation from 1990 to 2011

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-46.6678</td>
<td>43.9217</td>
<td>-1.0625 [.301]</td>
</tr>
<tr>
<td>C</td>
<td>11.5784</td>
<td>11.5700</td>
<td>1.0007 [.330]</td>
</tr>
<tr>
<td>D</td>
<td>-6.6085</td>
<td>11.8544</td>
<td>-.55748 [.584]</td>
</tr>
</tbody>
</table>

R-Squared  .88417  R-Bar-Squared  .87198
S.E. of Regression  45.3465  F-stat.  F( 2, 19)  72.5168 [.000]
Mean of Dependent Variable  405.7782  S.D. of Dependent Variable  126.7361
Residual Sum of Squares  39069.7  Equation Log-likelihood  -113.5193
Akaike Info. Criterion  -116.5193  Schwarz Bayesian Criterion  -118.1559
DW-statistic  1.1182

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* A: Serial Correlation*CHSQ( 1)= 3.3417 [.068]*F( 1, 18)= 3.2238 [.089]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* B: Functional Form *CHSQ( 1)= 11.8202 [.001]*F( 1, 18)= 20.9005 [.000]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

82
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

GDP capita crop food production

Autocorrelation function of residuals, sample from 1990 to 2011
Standardized Spectral Density of Residuals (Parzen Window)

Histogram of Residuals and the Normal Density
Ordinary Least Squares Estimation

Dependent variable is GG
21 observations used for estimation from 1991 to 2011

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-31.4638</td>
<td>36.9647</td>
<td>-.85119 [.405]</td>
</tr>
<tr>
<td>GDP1</td>
<td>1.1332</td>
<td>.091547</td>
<td>12.3783 [.000]</td>
</tr>
</tbody>
</table>

R-Squared                     .88968   R-Bar-Squared                   .88387
S.E. of Regression           43.4984   F-stat.    F(  1,  19)  153.2230 [.000]
Mean of Dependent Variable  410.7539   S.D. of Dependent Variable    127.6449
Residual Sum of Squares      35950.0   Equation Log-likelihood      -107.9740
Akaike Info. Criterion     -109.9740   Schwarz Bayesian Criterion   -111.0185
DW-statistic                  2.9054

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics *</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation*CHSQ( 1)= 5.2386 [.022]*F( 1, 18)= 5.9826 [.025]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B:Functional Form  *CHSQ( 1)= .33351 [.564]*F( 1, 18)= .29047 [.597]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

85
A: Lagrange multiplier test of residual serial correlation

B: Ramsey's RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

D: Based on the regression of squared residuals on squared fitted values
Ordinary Least Squares Estimation

***********************************************************************

Dependent variable is GG

21 observations used for estimation from 1991 to 2011

***********************************************************************

Regressor              Coefficient       Standard Error         T-Ratio[Prob]
CON                     -151756.0            29470.7            -5.1494[.000]
DLNGDP1                  -25596.1             4846.6            -5.2813[.000]
DLNGDP2                  152108.2            29464.1             5.1625[.000]

***********************************************************************

R-Squared                     .68471   R-Bar-Squared                   .64967
S.E. of Regression           75.5509   F-stat.    F(  2,  18)   19.5448[.000]
Mean of Dependent Variable  410.7539   S.D. of Dependent Variable    127.6449
Residual Sum of Squares     102743.0   Equation Log-likelihood      -119.0001
Akaike Info. Criterion     -122.0001   Schwarz Bayesian Criterion   -123.5669
DW-statistic                  .85181

***********************************************************************
### Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistic</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Serial Correlation</td>
<td>CHSQ(1) = 4.3409[.037]</td>
<td>F(1, 17) = 4.4297[.051]</td>
</tr>
<tr>
<td>B: Functional Form</td>
<td>CHSQ(1) = 0.016369[.898]</td>
<td>F(1, 17) = 0.013262[.910]</td>
</tr>
<tr>
<td>C: Normality</td>
<td>CHSQ(2) = 2.6112[.271]</td>
<td>Not applicable</td>
</tr>
<tr>
<td>D: Heteroscedasticity</td>
<td>CHSQ(1) = 8.0479[.005]</td>
<td>F(1, 19) = 11.8059[.003]</td>
</tr>
</tbody>
</table>

A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
GDP CAPITA LOG DIF GDP DLOG GDP2

<table>
<thead>
<tr>
<th>GDP CAPITA</th>
<th>Fitted</th>
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<tbody>
<tr>
<td>Years</td>
<td></td>
</tr>
<tr>
<td>200.00</td>
<td></td>
</tr>
<tr>
<td>300.00</td>
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<td>400.00</td>
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<td>700.00</td>
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<tr>
<td>2009</td>
<td>2010</td>
</tr>
<tr>
<td>2011</td>
<td></td>
</tr>
</tbody>
</table>

Histogram of Residuals and the Normal Density

Autocorrelation function of residuals, sample from 1991 to 2011

Order of lags

Frequency

Frequency

Frequency
Foreign Direct Investment-D- CON GDP /Capita-(G)

Ordinary Least Squares Estimation

Dependent variable is D

22 observations used for estimation from 1990 to 2011

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-7.47E+08</td>
<td>1.12E+08</td>
<td>-6.6454 [.000]</td>
</tr>
<tr>
<td>G</td>
<td>2746192</td>
<td>269165.7</td>
<td>10.2026 [.000]</td>
</tr>
</tbody>
</table>

R-Squared                     .83883   R-Bar-Squared                   .83077
S.E. of Regression          1.57E+08   F-stat. F( 1, 20) 104.0932[.000]
Mean of Dependent Variable  3.48E+08   S.D. of Dependent Variable    3.82E+08
Residual Sum of Squares     4.93E+17   Equation Log-likelihood      -445.3455
Akaike Info. Criterion     -447.3455   Schwarz Bayesian Criterion   -448.4365
DW-statistic                .92454

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation*CHSQ( 1)</td>
<td>6.2926 [.012]</td>
<td>F( 1, 19) = 7.6117 [.012]</td>
</tr>
</tbody>
</table>
* B: Functional Form  \( \chi^2(1) = 7.0883[.008] \) \( F(1, 19) = 9.0316[.007] \)

* C: Normality  \( \chi^2(2) = 5.9530[.051] \) Not applicable

* D: Heteroscedasticity  \( \chi^2(1) = .44813[.503] \) \( F(1, 20) = .41586[.526] \)

A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

**Foreign direct investment net flow/GDP capita**

![Graph showing foreign direct investment and fitted values over years from 1990 to 2010.](image-url)
### Ordinary Least Squares Estimation

Dependent variable is G

22 observations used for estimation from 1990 to 2011

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>292.3083</td>
<td>15.2623</td>
<td>19.1523 [.000]</td>
</tr>
<tr>
<td>D</td>
<td>.3055E-6</td>
<td>.2994E-7</td>
<td>10.2026 [.000]</td>
</tr>
</tbody>
</table>

R-Squared: .83883  R-Bar-Squared: .83077
S.E. of Regression: 52.3575  F-stat: F( 1, 20) = 104.0932 [.000]
Mean of Dependent Variable: 398.5000  S.D. of Dependent Variable: 127.2750
Residual Sum of Squares: 54826.1  Equation Log-likelihood: -117.2463
Akaike Info. Criterion: -119.2463  Schwarz Bayesian Criterion: -120.3374

DW-statistic: .79933

### Diagnostic Tests

Test Statistics  | LM Version | F Version |
-----------------|------------|-----------|
* Serial Correlation*CHSQ(1) = 7.1351 [.008]  | *F(1, 19) = 9.1200 [.007]*  | * |

---

92
## Ordinary Least Squares Estimation

Dependent variable is H

22 observations used for estimation from 1990 to 2011

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>121.0387</td>
<td>14.9756</td>
<td>8.0824 [.000]</td>
</tr>
<tr>
<td>G</td>
<td>.51992</td>
<td>.035874</td>
<td>14.4930 [.000]</td>
</tr>
</tbody>
</table>

R-Squared: .91306
R-Bar-Squared: .90871

S.E. of Regression: 20.9234
F-stat.: F(1, 20) = 210.0477 [.000]

Mean of Dependent Variable: 328.2273
S.D. of Dependent Variable: 69.2517

Residual Sum of Squares: 8755.7
Equation Log-likelihood: -97.0673

Akaike Info. Criterion: -99.0673
Schwarz Bayesian Criterion: -100.1583

DW-statistic: .24587

### Graph

**GDP capita/Direct foreign investment**


**Fitted**

- G: GDP capita
- Fitted: GDP capita/Direct foreign investment
### Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Serial Correlation</td>
<td>CHSQ(1) = 16.4974 [.000]</td>
<td>F(1, 19) = 56.9634 [.000]</td>
</tr>
<tr>
<td>B: Functional Form</td>
<td>CHSQ(1) = 12.9493 [.000]</td>
<td>F(1, 19) = 27.1841 [.000]</td>
</tr>
<tr>
<td>C: Normality</td>
<td>CHSQ(2) = 2.2564 [.324]</td>
<td>Not applicable</td>
</tr>
<tr>
<td>D: Heteroscedasticity</td>
<td>CHSQ(1) = 0.049075 [.825]</td>
<td>F(1, 20) = 0.044713 [.835]</td>
</tr>
</tbody>
</table>

**A:** Lagrange multiplier test of residual serial correlation

**B:** Ramsey’s RESET test using the square of the fitted values

**C:** Based on a test of skewness and kurtosis of residuals

**D:** Based on the regression of squared residuals on squared fitted values
Ordinary Least Squares Estimation

****************************************************************************************
Dependent variable is G
22 observations used for estimation from 1990 to 2011
****************************************************************************************

Regressor              Coefficient       Standard Error         T-Ratio[Prob]
CON                     -177.9175            40.6083            -4.3813[.000]
H                          1.7562             .12117            14.4930[.000]

****************************************************************************************
R-Squared                     .91306   R-Bar-Squared                   .90871
S.E. of Regression           38.4542   F-stat.    F(  1,  20)  210.0477[.000]
Mean of Dependent Variable  398.5000   S.D. of Dependent Variable    127.2750
Residual Sum of Squares      29574.5   Equation Log-likelihood      -110.4565
Akaike Info. Criterion     -112.4565   Schwarz Bayesian Criterion   -113.5476
DW-statistic                  .27406

****************************************************************************************

Agriculture Value Added/ GDP capita

H Agriculture value added per worker

Ordinary Least Squares Estimation

****************************************************************************************
Dependent variable is G
22 observations used for estimation from 1990 to 2011
****************************************************************************************

Regressor              Coefficient       Standard Error         T-Ratio[Prob]
CON                     -177.9175            40.6083            -4.3813[.000]
H                          1.7562             .12117            14.4930[.000]

****************************************************************************************
R-Squared                     .91306   R-Bar-Squared                   .90871
S.E. of Regression           38.4542   F-stat.    F(  1,  20)  210.0477[.000]
Mean of Dependent Variable  398.5000   S.D. of Dependent Variable    127.2750
Residual Sum of Squares      29574.5   Equation Log-likelihood      -110.4565
Akaike Info. Criterion     -112.4565   Schwarz Bayesian Criterion   -113.5476
DW-statistic                  .27406

****************************************************************************************
Diagnostic Tests

*******************************************************************************
* Test Statistics *       LM Version        *         F Version          *
*******************************************************************************
*                     *                          *                            *
* A:Serial Correlation*CHSQ( 1)= 16.4452[.000]*F( 1, 19)= 56.2504[.000]*
*                     *                          *                            *
* B:Functional Form   *CHSQ( 1)= 17.5670[.000]*F( 1, 19)= 75.2934[.000]*
*                     *                          *                            *
* C:Normality         *CHSQ( 2)= .90121[.637]* Not applicable  *
*                     *                          *                            *
* D:Heteroscedasticity*CHSQ( 1)= 8.7253[.003]*F( 1, 20)= 13.1459[.002]*
*******************************************************************************

A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

GDP capita/Agriculture Value Added per worker

Years

GDP capita
Fitted
GDP PER CAPITA (K) CON IMPORTS OF GOODS AND SERVICES (Z)

Ordinary Least Squares Estimation

***********************************************************************************************************************************************
Dependent variable is K
8 observations used for estimation from 2005 to 2012
***********************************************************************************************************************************************
Regressor Coefficient Standard Error T-Ratio[Prob]
CON 417.3985 21.5431 19.3751 [.000]
Z .7837E-8 .8712E-9 8.9950 [.000]
***********************************************************************************************************************************************
R-Squared .93096 R-Bar-Squared .91946
S.E. of Regression 36.5746 F-stat. F{ 1, 6} 80.9105 [.000]
Mean of Dependent Variable 572.3876 S.D. of Dependent Variable 128.8746
Residual Sum of Squares 8026.2 Equation Log-likelihood -38.9956
Akaike Info. Criterion -40.9956 Schwarz Bayesian Criterion -41.0751
DW-statistic 2.4588
***********************************************************************************************************************************************
Diagnostic Tests
***********************************************************************************************************************************************
* Test Statistics * LM Version * F Version *
***********************************************************************************************************************************************
* * * *
* A:Serial Correlation*CHSQ( 1)= .58044(.446)*F{ 1, 5}= .39116(.559)*
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

gdp capita import goods services

Years

- gdp capita
- Fitted
Ordinary Least Squares Estimation

Dependent variable is K

8 observations used for estimation from 2005 to 2012

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>475.7895</td>
<td>28.5027</td>
<td>16.6928[.000]</td>
</tr>
<tr>
<td>F</td>
<td>.9267E-8</td>
<td>.1817E-8</td>
<td>5.1012[.002]</td>
</tr>
</tbody>
</table>

R-Squared                     .81263   R-Bar-Squared                   .78140
S.E. of Regression           60.2542   F-stat.   F(  1,   6)   26.0227[.002]
Mean of Dependent Variable  572.3876   S.D. of Dependent Variable    128.8746
Residual Sum of Squares      21783.4   Equation Log-likelihood       -42.9894
Akaike Info. Criterion      -44.9894   Schwarz Bayesian Criterion    -45.0688
DW-statistic                  1.1071

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ( 1)= 1.1897[.275] F( 1, 5)= .87349[.393]</td>
<td></td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ( 1)= .015556[.901] F( 1, 5)= .0097416[.925]</td>
<td></td>
</tr>
</tbody>
</table>
* C: Normality
  *CHSQ( 2) = 0.67467[.714]*
  Not applicable *

* D: Heteroscedasticity
  *CHSQ( 1) = 2.5612[.110]*
  F( 1, 6) = 2.8254[.144]*

*******************************************************************************

A: Lagrange multiplier test of residual serial correlation

![Graph of Residuals and Two Standard Error Bands]

Plot of Residuals and Two Standard Error Bands
GDP PER CAPITA (K)  CON IMPORTS OF GOODS AND SERVICES (Z), EXPORTS OF GOODS AND SERVICES (BOP CURRENT USD) (F)

Ordinary Least Squares Estimation

Dependent variable is K

8 observations used for estimation from 2005 to 2012

Regressor              Coefficient       Standard Error         T-Ratio[Prob]
CON                      425.6328            16.2297            26.2255[.000]
Z                        .5587E-8           .1118E-8             4.9969[.004]
F                        .3479E-8           .1415E-8             2.4581[.057]

R-Squared                     .96874   R-Bar-Squared                   .95624
S.E. of Regression           26.9606   F-stat.    F(  2,   5)   77.4728[.000]
Mean of Dependent Variable  572.3876   S.D. of Dependent Variable    128.8746
Residual Sum of Squares      3634.4   Equation Log-likelihood       -35.8265
Akaike Info. Criterion       -38.8265   Schwarz Bayesian Criterion    -38.9457
DW-statistic                  3.2084

Histogram of Residuals and the Normal Density
Diagnostic Tests

*******************************************************************************
*     Test Statistics  *        LM Version        *         F Version          *
*******************************************************************************
*                     *                          *                            *
* A:Serial Correlation*CHSQ( 1)= 3.8332[.050]*F( 1, 4)= 3.6798[.128]*
*                     *                          *                            *
* B:Functional Form   *CHSQ( 1)= 0.030581[.861]*F( 1, 4)= 0.015349[.907]*
*                     *                          *                            *
* C:Normality         *CHSQ( 2)= 0.27503[.872]*       Not applicable       *
*                     *                          *                            *
* D:Heteroscedasticity*CHSQ( 1)= 1.1158[.291]*F( 1, 6)= 0.97249[.362]*
*******************************************************************************

A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
Autocorrelation function of residuals, sample from 2005 to 2012

Histogram of Residuals and the Normal Density
Ordinary Least Squares Estimation

Dependent variable is K

8 observations used for estimation from 2005 to 2012

Regressors | Coefficient | Standard Error | T-Ratio [Prob]
--- | --- | --- | ---
CON | 450.2514 | 57.5452 | 7.8243 [.001]
F | .9110E-8 | .1961E-8 | 4.6458 [.006]
E | .8740E-8 | .1672E-7 | .52270 [.624]

R-Squared = .82234
R-Bar-Squared = .75128
S.E. of Regression = 64.2725
F-stat. F( 2, 5) = 11.5719 [.013]
Mean of Dependent Variable = 572.3876
S.D. of Dependent Variable = 128.8746
Residual Sum of Squares = 20654.8
Equation Log-likelihood = -42.7765
Akaike Info. Criterion = -45.7765
Schwarz Bayesian Criterion = -45.8957
DW-statistic = 1.4191

Diagnostic Tests

A: Serial Correlation

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Serial Correlation</td>
<td>CHSQ( 1) = .61442 [.433] F( 1, 4) = .33277 [.595]</td>
<td></td>
</tr>
<tr>
<td>B: Functional Form</td>
<td>CHSQ( 1) = 1.0308 [.310] F( 1, 4) = .59161 [.485]</td>
<td></td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey’s RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
Autocorrelation function of residuals, sample from 2005 to 2012

Plot of Residuals and Two Standard Error Bands
GDP PER CAPITA (K) CON GOODS EXPORT (BOP CURRENT USD) (W)

Ordinary Least Squares Estimation

Dependent variable is K

8 observations used for estimation from 2005 to 2012

Regressors Coefficient Standard Error T-Ratio [Prob]
CON 504.4638 47.3782 10.6476 [.000]
W .8258E-8 .3694E-8 2.2355 [.067]

R-Squared .45441 R-Bar-Squared .36348
S.E. of Regression 102.8190 F-stat. F( 1, 6) 4.9973 [.067]
Mean of Dependent Variable 572.3876 S.D. of Dependent Variable 128.8746
Residual Sum of Squares 63430.4 Equation Log-likelihood -47.2645
Akaike Info. Criterion -49.2645 Schwarz Bayesian Criterion -49.3440
DW-statistic .51995

Diagnostic Tests

Test Statistics LM Version F Version
A:Serial Correlation*CHSQ( 1)= 3.6378 [.056]*F( 1, 5)= 4.1697 [.097]*
B:Functional Form *CHSQ( 1)= 2.6224 [.105]*F( 1, 5)= 2.4382 [.179]*
* C: Normality  \( \chi^2 (2) = 0.22134 \)  Not applicable  *

* D: Heteroscedasticity  \( \chi^2 (1) = 0.77748 \)  \( F(1, 6) = 0.64588 \)

*******************************************************************************

A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

---

gdp capita goods exports

![Graph showing gdp capita and fitted values over years]

Years

- gdp capita
- Fitted
Plot of Residuals and Two Standard Error Bands

Histogram of Residuals and the Normal Density
GDP PER CAPITA(K) CON SERVICE EXPORT ( BOP CURRENT USD)(P)

Ordinary Least Squares Estimation

Dependent variable is K

8 observations used for estimation from 2005 to 2012

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>36.0314</td>
<td>64.0066</td>
<td>.56293[.594]</td>
</tr>
<tr>
<td>P</td>
<td>.2629E-6</td>
<td>.3067E-7</td>
<td>8.5731[.000]</td>
</tr>
</tbody>
</table>

R-Squared                     .92453   R-Bar-Squared                   .91195
S.E. of Regression           38.2416   F-stat.    F(  1,   6)   73.4988[.000]
Mean of Dependent Variable  572.3876   S.D. of Dependent Variable    128.8746
Residual Sum of Squares       8774.5   Equation Log-likelihood       -39.3522
Akaike Info. Criterion      -41.3522   Schwarz Bayesian Criterion    -41.4316
DW-statistic                  2.3295

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ( 1)= .36832[.544]<em>F( 1, 5)= .24131[.644]</em></td>
<td></td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ( 1)= .50341[.478]<em>F( 1, 5)= .33576[.587]</em></td>
<td></td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
Histogram of Residuals and the Normal Density

Plot of Residuals and Two Standard Error Bands
Ordinary Least Squares Estimation

Dependent variable is K

8 observations used for estimation from 2005 to 2012

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>76.5673</td>
<td>64.1256</td>
<td>1.1940 [.286]</td>
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<tr>
<td>W</td>
<td>.2286E-8</td>
<td>.1520E-8</td>
<td>1.5037 [.193]</td>
</tr>
<tr>
<td>P</td>
<td>.2338E-6</td>
<td>.3393E-7</td>
<td>6.8913 [.001]</td>
</tr>
</tbody>
</table>

R-Squared                     .94803   R-Bar-Squared                   .92724
S.E. of Regression           34.7627   F-stat.    F(  2,   5)   45.6035 [.001]
Mean of Dependent Variable  572.3876   S.D. of Dependent Variable    128.8746
Residual Sum of Squares       6042.2   Equation Log-likelihood       -37.8598
Akaike Info. Criterion      -40.8598   Schwarz Bayesian Criterion    -40.9790
DW-statistic                  2.0690

Diagnostic Tests

* Test Statistics *  LM Version    *  F Version    *

* A:Serial Correlation*CHSQ( 1)=  .11519(.734)*F( 1,  4)=  .058437(.821)*
A: Lagrange multiplier test of residual serial correlation

B: Ramsey's RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

D: Based on the regression of squared residuals on squared fitted values

---

### gdp capita goods exports service export

- **gdp capita**
- **Fitted**
Plot of Residuals and Two Standard Error Bands

Autocorrelation function of residuals, sample from 2005 to 2012

Histogram of Residuals and the Normal Density
Ordinary Least Squares Estimation

Dependent variable is K

8 observations used for estimation from 2005 to 2012

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>475.7266</td>
<td>28.5259</td>
<td>16.6770[.000]</td>
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<tr>
<td>RR</td>
<td>.9216E-8</td>
<td>.1808E-8</td>
<td>5.0982[.002]</td>
</tr>
</tbody>
</table>

R-Squared                     .81245   R-Bar-Squared                   .78120
S.E. of Regression           60.2831   F-stat.    F(  1,   6)   25.9920[.002]
Mean of Dependent Variable  572.3876   S.D. of Dependent Variable    128.8746
Residual Sum of Squares      21804.3   Equation Log-likelihood       -42.9932
Akaike Info. Criterion      -44.9932   Schwarz Bayesian Criterion    -45.0726
DW-statistic                  1.1063

Diagnostic Tests

* Test Statistics *      IM Version      *       F Version       *

*                      *                          *                            *
* A:Serial Correlation*CHSQ( 1)= 1.1936[.275] F( 1, 5)= .8768[.392]*
*                      *                          *                            *
* B:Functional Form   *CHSQ( 1)= .014637[.904] F( 1, 5)= .0091652[.927]*
*                      *                          *                            *
* C:Normality         *CHSQ( 2)= .67721[.713] Not applicable  *

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* D:Heteroscedasticity \( \chi^2(1) = 2.5598 \) \( [0.110] \) \( F(1, 6) = 2.8232 \) \( [0.144] \)

A: Lagrange multiplier test of residual serial correlation

B: Ramsey's RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

D: Based on the regression of squared residuals on squared fitted values

---

**Plot of Residuals and Two Standard Error Bands**

![Graph showing residuals and two standard error bands](image-url)
RELATION BETWEEN DEPOSIT INTEREST RATE, LENDING INTEREST RATE, INFLATION
Ordinary Least Squares Estimation

Dependent variable is F

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>.97140</td>
<td>.056490</td>
<td>17.1960[.000]</td>
</tr>
<tr>
<td>G</td>
<td>2.5114</td>
<td>.26076</td>
<td>9.6313[.000]</td>
</tr>
</tbody>
</table>

R-Squared                     .83000   R-Bar-Squared                   .82105
S.E. of Regression            .10255   F-stat.    F(  1,  19)   92.7619[.000]
Mean of Dependent Variable    1.4710   S.D. of Dependent Variable      .24242
Residual Sum of Squares       .19982   Equation Log-likelihood        19.0783
Akaike Info. Criterion        17.0783  Schwarz Bayesian Criterion     16.0338
DW-statistic                  2.1762

Diagnostic Tests

* Test Statistics *   LM Version *   F Version *

* A:Serial Correlation*CHSQ( 1)= .19865[.656]*F( 1, 18)= .17190[.683]*
* B:Functional Form  *CHSQ( 1)= .0016187[.968]*F( 1, 18)= .0013875[.971]*
* C: Normality
  CHSQ( 2) = 1.2583[.533]* Not applicable *

* D: Heteroscedasticity
  CHSQ( 1) = 5.1389[.023]* F( 1, 19) = 6.1559[.023]*

*******************************************************************************

A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

![Graph showing CO2 intensity and emissions over years]
**Ordinary Least Squares Estimation**

Dependent variable is $G$

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-.28722</td>
<td>.051123</td>
<td>-5.6182 [.000]</td>
</tr>
<tr>
<td>F</td>
<td>.33049</td>
<td>.034314</td>
<td>9.6313 [.000]</td>
</tr>
</tbody>
</table>

R-Squared                     .83000   R-Bar-Squared                   .82105
S.E. of Regression           .037201   F-stat.  F( 1, 19)   92.7619 [.000]
Mean of Dependent Variable    .19891   S.D. of Dependent Variable     .087941
Residual Sum of Squares      .026295   Equation Log-likelihood        40.3728
Akaike Info. Criterion       38.3728   Schwarz Bayesian Criterion     37.3283
DW-statistic                  1.9894

**Diagnostic Tests**

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHSQ(1) = .021128 [.884]</td>
<td>F(1, 18) = .018128 [.894]</td>
<td>*</td>
</tr>
</tbody>
</table>
* B: Functional Form   *CHSQ( 1)= 6.6225[.010]*F( 1, 18)= 8.2910[.010]*
* C: Normality   *CHSQ( 2)= .69316[.707]* Not applicable *
* D: Heteroscedasticity*CHSQ( 1)= 4.2269[.040]*F( 1, 19)= 4.7881[.041]*
**Ordinary Least Squares Estimation**

Dependent variable is D

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-2.85E+09</td>
<td>1.12E+08</td>
<td>-25.3924 [0.000]</td>
</tr>
<tr>
<td>E</td>
<td>1.62E+08</td>
<td>831158.7</td>
<td>194.5598 [0.000]</td>
</tr>
</tbody>
</table>

R-Squared                     .99950   R-Bar-Squared                   .99947
S.E. of Regression          2.30E+08   F-stat.  F(  1,  19)   37853.5 [0.000]
Mean of Dependent Variable  1.67E+10   S.D. of Dependent Variable    1.00E+10
Residual Sum of Squares     1.00E+18   Equation Log-likelihood      -433.0652
Akaike Info. Criterion     -435.0652   Schwarz Bayesian Criterion   -436.1097
DW-statistic                  .63416

**Diagnostic Tests**

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Serial Correlation</td>
<td>CHSQ( 1) = 7.4521 [.006]</td>
<td>F( 1, 18) = 9.9010 [.006]</td>
</tr>
<tr>
<td>B: Functional Form</td>
<td>CHSQ( 1) = 8.6642 [.003]</td>
<td>F( 1, 18) = 12.6425 [.002]</td>
</tr>
</tbody>
</table>
* C: Normality  \( CHSQ(2) = 0.69100[.708] \)  Not applicable  *

* D: Heteroscedasticity  \( CHSQ(1) = 1.1520[.283] \)  \( F(1, 19) = 1.1028[.307] \)

*******************************************************************************

A: Lagrange multiplier test of residual serial correlation

B: Ramsey's RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

D: Based on the regression of squared residuals on squared fitted values

---

Plot of Actual and Fitted Values

---

D: electr consum total per capita

Fitted
**Ordinary Least Squares Estimation**

Dependent variable is H

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>14.9063</td>
<td>.56368</td>
<td>26.4448[.000]</td>
</tr>
<tr>
<td>E</td>
<td>-.013787</td>
<td>.0041685</td>
<td>-3.3073[.004]</td>
</tr>
</tbody>
</table>

R-Squared: .36536  R-Bar-Squared: .33196
S.E. of Regression: 1.1531  F-stat.: F(  1,  19) = 10.9382[.004]
Mean of Dependent Variable: 13.2381  S.D. of Dependent Variable: 1.4108
Residual Sum of Squares: 25.2647  Equation Log-likelihood: -31.7390
Akaike Info. Criterion: -33.7390  Schwarz Bayesian Criterion: -34.7835
DW-statistic: .62357

**Diagnostic Tests**

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ(1) = 8.3060[.004] <em>F(1, 18) = 11.7779[.003]</em></td>
<td></td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ(1) = 1.9085[.167] <em>F(1, 18) = 1.7994[.196]</em></td>
<td></td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

CO2 from residential buildings electric power consumption

Years


H: CO2 from residential
Fitted
CO₂ EMISSIONS FROM ELECTRICITY AND HEAT PRODUCTION -I -CON ELECTRIC POWER CONSUMPTION kWh per capita -E-

Ordinary Least Squares Estimation

*******************************************************************************
Dependent variable is I
21 observations used for estimation from 1990 to 2010
*******************************************************************************

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>29.1615</td>
<td>1.0112</td>
<td>28.8383 [.000]</td>
</tr>
<tr>
<td>E</td>
<td>.067142</td>
<td>.0074781</td>
<td>8.9785 [.000]</td>
</tr>
</tbody>
</table>

*******************************************************************************
R-Squared                     .80926   R-Bar-Squared                   .79922
S.E. of Regression            2.0687   F-stat.   F(  1,  19)   80.6137 [.000]
Mean of Dependent Variable   37.2857   S.D. of Dependent Variable      4.6167
Residual Sum of Squares      81.3084   Equation Log-likelihood       -44.0118
Akaike Info. Criterion      -46.0118   Schwarz Bayesian Criterion    -47.0564
DW-statistic                  1.0885

*******************************************************************************
Diagnostic Tests
*******************************************************************************
* Test Statistics *    LM Version       *    F Version       *
*******************************************************************************
*                        *                          *                            *
* A:Serial Correlation   *CHSQ(  1)= 4.2863 [.038]*F(  1,  18)= 4.6161 [.046]*
*                        *                          *                            *
* B:Functional Form      *CHSQ(  1)= 3.6035 [.058]*F(  1,  18)= 3.7285 [.069]*
A: Lagrange multiplier test of residual serial correlation
B: Ramsey’s RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

CO2 from electricity heat production /electric power consum

![Graph showing CO2 emissions and fitted values from 1990 to 2010]
CO2 EMISSIONS FROM MANUFACTURING INDUSTRY AND CONSTRUCTION – J-CON ELECTRIC POWER CONSUMPTION kWh per capita - E -

Ordinary Least Squares Estimation

*******************************************************************************
Dependent variable is J
21 observations used for estimation from 1990 to 2010
*******************************************************************************

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>35.4386</td>
<td>1.3765</td>
<td>25.7455 [.000]</td>
</tr>
<tr>
<td>E</td>
<td>-.056753</td>
<td>.010180</td>
<td>-5.5753 [.000]</td>
</tr>
</tbody>
</table>

*******************************************************************************
R-Squared                     .62063   R-Bar-Squared                   .60067
S.E. of Regression            2.8160   F-stat.    F(  1,  19)   31.0835 [.000]
Mean of Dependent Variable    28.5714   S.D. of Dependent Variable      4.4561
Residual Sum of Squares      150.6627   Equation Log-likelihood       -50.4882
Akaike Info. Criterion       -52.4882   Schwarz Bayesian Criterion    -53.5327
DW-statistic                  .99089

*******************************************************************************
Diagnostic Tests
*******************************************************************************

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation*CHSQ( 1) = 4.8837 [.027]*F( 1, 18) = 5.4545 [.031]</td>
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</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>CO2 from manufacturing industries</td>
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<tr>
<td>Fitted</td>
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</tbody>
</table>

**A:** Lagrange multiplier test of residual serial correlation

**B:** Ramsey's RESET test using the square of the fitted values

**C:** Based on a test of skewness and kurtosis of residuals

**D:** Based on the regression of squared residuals on squared fitted values
Ordinary Least Squares Estimation

Dependent variable is K

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>5.6505</td>
<td>.37379</td>
<td>15.1166[.000]</td>
</tr>
<tr>
<td>E</td>
<td>-.6534E-3</td>
<td>.0027643</td>
<td>-.23637 [.816]</td>
</tr>
</tbody>
</table>

R-Squared                   .0029319   R-Bar-Squared                 -.049545
S.E. of Regression            .76469   F-stat.    F( 1, 19)   .055869 [.816]|
Mean of Dependent Variable    5.5714   S.D. of Dependent Variable      .74642
Residual Sum of Squares      11.1102   Equation Log-likelihood       -23.1128
Akaike Info. Criterion      -25.1128   Schwarz Bayesian Criterion    -26.1573
DW-statistic                  1.6237

Diagnostic Tests

Test Statistics *   LM Version   *   F Version   *
A:Serial Correlation*CHSQ(1) = .13307 [.715]*F(1, 18) = .11479 [.739]
A: Lagrange multiplier test of residual serial correlation

B: Ramsey's RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

---

CO2 from other sectors/electric consump per capita kWh/capita

- **K CO2 from other sectors**
- **Fitted**

Years

<table>
<thead>
<tr>
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<tr>
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<tr>
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</tr>
</tbody>
</table>
Ordinary Least Squares Estimation

Dependent variable is L
21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
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<tbody>
<tr>
<td>CON</td>
<td>12.5536</td>
<td>.55041</td>
<td>22.8076[.000]</td>
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<tr>
<td>E</td>
<td>.0025090</td>
<td>.0040704</td>
<td>.61640[.545]</td>
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R-Squared                    .019605   R-Bar-Squared                 -.031994
S.E. of Regression            1.1260   F-stat.    F(  1,  19)    .37995[.545]
Mean of Dependent Variable   12.8571   S.D. of Dependent Variable      1.1084
Residual Sum of Squares      24.0897   Equation Log-likelihood       -31.2390
Akaike Info. Criterion      -33.2390   Schwarz Bayesian Criterion    -34.2835
DW-statistic                  .79025

Diagnostic Tests

<table>
<thead>
<tr>
<th>* Test Statistics *</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ(  1)= 7.1137[.008]<em>F(  1,  18)= 9.2211[.007]</em></td>
<td></td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ(  1)= 9.5909[.002]<em>F(  1,  18)= 15.1315[.001]</em></td>
<td></td>
</tr>
</tbody>
</table>
C: Normality

\[ \chi^2(2) = 1.0710[.585] \]

Not applicable

D: Heteroscedasticity

\[ \chi^2(1) = 1.3071[.253] \]

\[ F(1, 19) = 1.2611[.275] \]

*******************************************************************************

A: Lagrange multiplier test of residual serial correlation

CO2 emissions from transport / electr power consump
kWh/capita

Years


L CO2 from transport

Fitted
Ordinary Least Squares Estimation

Dependent variable is E

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-428.5034</td>
<td>44.2730</td>
<td>-9.6787[.000]</td>
</tr>
<tr>
<td>M</td>
<td>.54566</td>
<td>.043729</td>
<td>12.4783[.000]</td>
</tr>
</tbody>
</table>

R-Squared                     .89125   R-Bar-Squared                   .88552
Mean of Dependent Variable  121.0000   S.D. of Dependent Variable     61.8563
Residual Sum of Squares       8322.2   Equation Log-likelihood       -92.6104
Akaike Info. Criterion      -94.6104   Schwarz Bayesian Criterion    -95.6549
DW-statistic                  .21661

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics *</th>
<th>LM Version *</th>
<th>F Version *</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation*CHSQ( 1)= 15.5954[.000]<em>F( 1, 18)= 51.9409[.000]</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
CO2 EMISSIONS (metric ton per capita) - G - POPULATION DENSITY - M -

Ordinary Least Squares Estimation

*******************************************************************************
Dependent variable is G
21 observations used for estimation from 1990 to 2010
*******************************************************************************

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
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</thead>
<tbody>
<tr>
<td>CON</td>
<td>-.56577</td>
<td>.072954</td>
<td>-7.7551[.000]</td>
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<tr>
<td>M</td>
<td>.7593E-3</td>
<td>.7206E-4</td>
<td>10.5379[.000]</td>
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*******************************************************************************

R-Squared                     .85390   R-Bar-Squared                   .84621
S.E. of Regression           .034487   F-stat.    F(  1,  19)  111.0468[.000]
Mean of Dependent Variable    .19891   S.D. of Dependent Variable     .087941
Residual Sum of Squares      .022598   Equation Log-likelihood        41.9638
Akaike Info. Criterion       39.9638   Schwarz Bayesian Criterion     38.9193
DW-statistic                  1.1611

CO2 emissions /Population density

0.0  0.1  0.2  0.3  0.4

Years

G CO2 emissions
Fitted
Ordinary Least Squares Estimation

Dependent variable is D
21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-1.77E+10</td>
<td>2.68E+09</td>
<td>-6.5860[.000]</td>
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<tr>
<td>O</td>
<td>8.99E+07</td>
<td>6773883</td>
<td>13.2698[.000]</td>
</tr>
</tbody>
</table>

R-Squared                     .90261   R-Bar-Squared                   .89748
S.E. of Regression          3.20E+09   F-stat.    F(  1,  19)  176.0869[.000]
Mean of Dependent Variable  1.67E+10   S.D. of Dependent Variable    1.00E+10
Residual Sum of Squares     1.95E+20   Equation Log-likelihood      -488.3848
Akaike Info. Criterion     -490.3848   Schwarz Bayesian Criterion   -491.4294
DW-statistic                  .37860

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation*CHSQ( 1) = 14.3174[.000]<em>F( 1, 18) = 38.5652[.000]</em></td>
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<tr>
<td>B:Functional Form *CHSQ( 1) = 11.2029[.001]<em>F( 1, 18) = 20.5830[.000]</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
Ordinary Least Squares Estimation

*******************************************************************************
Dependent variable is O 
21 observations used for estimation from 1990 to 2010
*******************************************************************************

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>214.7953</td>
<td>14.6472</td>
<td>14.6646[.000]</td>
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<tr>
<td>D</td>
<td>.1004E-7</td>
<td>.7567E-9</td>
<td>13.2698[.000]</td>
</tr>
</tbody>
</table>

*******************************************************************************
R-Squared                     .90261   R-Bar-Squared                   .89748
S.E. of Regression           33.8594   F-stat.    F(  1,  19)  176.0869[.000]
Mean of Dependent Variable  382.6190   S.D. of Dependent Variable    105.7495
Residual Sum of Squares      21782.7   Equation Log-likelihood      -102.7134
Akaike Info. Criterion     -104.7134   Schwarz Bayesian Criterion   -105.7579
DW-statistic                  .41521
*******************************************************************************

Diagnostic Tests
*******************************************************************************
*          Test Statistics  *        LM Version        *         F Version          *
*******************************************************************************
*                     *                          *                            *
* A:Serial Correlation*CHSQ( 1)= 13.6498[.000]*F( 1, 18)= 33.4270[.000]*
*                     *                          *                            *
* B:Functional Form   *CHSQ( 1)= 9.8637[.002]*F( 1, 18)= 15.9432[.001]*
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
Ordinary Least Squares Estimation

*******************************************************************************
Dependent variable is E
21 observations used for estimation from 1990 to 2010
*******************************************************************************

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-90.5569</td>
<td>17.3523</td>
<td>-5.2187[.000]</td>
</tr>
<tr>
<td>O</td>
<td>.55292</td>
<td>.043787</td>
<td>12.6276[.000]</td>
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</tbody>
</table>

*******************************************************************************
R-Squared                     .89353   R-Bar-Squared                   .88793
S.E. of Regression           20.7078   F-stat.    F(  1,  19)  159.4558[.000]
Mean of Dependent Variable  121.0000   S.D. of Dependent Variable     61.8563
Residual Sum of Squares       8147.4   Equation Log-likelihood       -92.3875
Akaike Info. Criterion      -94.3875   Schwarz Bayesian Criterion    -95.4321
DW-statistic                  .38243

*******************************************************************************

Diagnostic Tests

*******************************************************************************
*    Test Statistics  *        LM Version        *         F Version          *
*******************************************************************************
*                     *                          *                            *
* A:Serial Correlation*CHSQ(  1)=  14.0533[.000]*F(  1,  18)=  36.4141[.000]*
*                     *                          *                            *
* B:Functional Form   *CHSQ(  1)=  11.4551[.001]*F(  1,  18)=  21.6024[.000]*
A: Lagrange multiplier test of residual serial correlation

B: Ramsey's RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

D: Based on the regression of squared residuals on squared fitted values

Electric power consumption per capita/GDP capita

E: Electrical consumption per capita

Fitted
Ordinary Least Squares Estimation

Dependent variable is P
21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-6.4571</td>
<td>6.2673</td>
<td>-1.0303[.316]</td>
</tr>
<tr>
<td>O</td>
<td>.12378</td>
<td>.015815</td>
<td>7.8270[.000]</td>
</tr>
</tbody>
</table>

R-Squared                     .76328   R-Bar-Squared                   .75082
S.E. of Regression            7.4792   F-stat.    F(  1,  19)   61.2627[.000]
Mean of Dependent Variable   40.9048   S.D. of Dependent Variable     14.9830
Residual Sum of Squares       1062.8   Equation Log-likelihood       -71.0016
Akaike Info. Criterion      -73.0016   Schwarz Bayesian Criterion    -74.0461
DW-statistic                  .32448

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ( 1) = 14.9624[.000]</td>
<td>F( 1, 18) = 44.6079[.000]</td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ( 1) = 8.7792[.003]</td>
<td>F( 1, 18) = 12.9310[.002]</td>
</tr>
</tbody>
</table>
* C: Normality \[\text{CHSQ}(2) = 2.8566[.240] \]
  Not applicable

* D: Heteroscedasticity \[\text{CHSQ}(1) = .32779[.567] \]
  \[\text{F}(1, 19) = .30128[.589] \]

******************************************************************************

A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

**Broad money / GDP capita**

- P: Broad money
- Fitted

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
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<td>80</td>
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<td>100</td>
<td>110</td>
<td>120</td>
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<tr>
<td>Fitted</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>90</td>
<td>100</td>
<td>110</td>
<td>120</td>
</tr>
</tbody>
</table>
Ornary Least Squares Estimation

Dependent variable is PR
21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>8.9412</td>
<td>5.8486</td>
<td>1.5288[.143]</td>
</tr>
<tr>
<td>O</td>
<td>.017577</td>
<td>.014758</td>
<td>1.1910[.248]</td>
</tr>
</tbody>
</table>

R-Squared                    .069473   R-Bar-Squared                  .020498
S.E. of Regression            6.9795   F-stat.    F(  1,  19)    1.4185[.248]
Mean of Dependent Variable   15.6667   S.D. of Dependent Variable      7.0522
Residual Sum of Squares     925.5642   Equation Log-likelihood       -69.5495
Akaike Info. Criterion      -71.5495   Schwarz Bayesian Criterion    -72.5940
DW-statistic                  1.7355    

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* A:Serial Correlation*CHSQ( 1)= .32403[.569]<em>F( 1, 18)= .28209[.602]</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* B:Functional Form *CHSQ( 1)= .066280[.797]<em>F( 1, 18)= .056991[.814]</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*</td>
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</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
### Ordinary Least Squares Estimation

**Dependent variable is R**

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-6.4571</td>
<td>6.2673</td>
<td>-1.0303 [.316]</td>
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<tr>
<td>O</td>
<td>.12378</td>
<td>.015815</td>
<td>7.8270 [.000]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>R-Squared</th>
<th>.76328</th>
<th>R-Bar-Squared</th>
<th>.75082</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.E. of Regression</td>
<td>7.4792</td>
<td>F-stat. F(1, 19)</td>
<td>61.2627 [.000]</td>
</tr>
<tr>
<td>Mean of Dependent Variable</td>
<td>40.9048</td>
<td>S.D. of Dependent Variable</td>
<td>14.9830</td>
</tr>
<tr>
<td>Residual Sum of Squares</td>
<td>1062.8</td>
<td>Equation Log-likelihood</td>
<td>-71.0016</td>
</tr>
<tr>
<td>Akaike Info. Criterion</td>
<td>-73.0016</td>
<td>Schwarz Bayesian Criterion</td>
<td>-74.0461</td>
</tr>
<tr>
<td>DW-statistic</td>
<td>.32448</td>
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</table>

### Diagnostic Tests

**Test Statistics**

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ(1) = 14.9624 [.000]</td>
<td>F(1, 18) = 44.6079 [.000]</td>
</tr>
<tr>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ(1) = 8.7792 [.003]</td>
<td>F(1, 18) = 12.9310 [.002]</td>
</tr>
<tr>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

Money quasy money % GDP / GDP capita

Years

R Money
Quasy %GDP

Fitted
### Ordinary Least Squares Estimation

**Dependent variable is P**

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>30.8049</td>
<td>8.2830</td>
<td>3.7190 [.001]</td>
</tr>
<tr>
<td>V</td>
<td>1.8284</td>
<td>1.3823</td>
<td>1.3227 [.202]</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>R-Squared</th>
<th>.084318</th>
<th>R-Bar-Squared</th>
<th>.036124</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.E. of Regression</td>
<td>14.7099</td>
<td>F-stat.</td>
<td>F( 1, 19)</td>
</tr>
<tr>
<td>Mean of Dependent Variable</td>
<td>40.9048</td>
<td>S.D. of Dependent Variable</td>
<td>14.9830</td>
</tr>
<tr>
<td>Residual Sum of Squares</td>
<td>4111.2</td>
<td>Equation Log-likelihood</td>
<td>-85.2058</td>
</tr>
<tr>
<td>Akaike Info. Criterion</td>
<td>-87.2058</td>
<td>Schwarz Bayesian Criterion</td>
<td>-88.2503</td>
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<tr>
<td>DW-statistic</td>
<td>.21428</td>
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### Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Serial Correlation</td>
<td>CHSQ(1) = 17.1752 [.000]</td>
<td>F(1, 18) = 80.8298 [.000]</td>
</tr>
<tr>
<td>B: Functional Form</td>
<td>CHSQ(1) = .15764 [.691]</td>
<td>F(1, 18) = .13614 [.716]</td>
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</table>
**C:** Normality

\[ \chi^2(2) = 1.9644[.374] \]

Not applicable

**D:** Heteroscedasticity

\[ \chi^2(1) = 4.8866[.027] \]

\[ F(1, 19) = 5.7620[.027] \]

*******************************************************************************

A: Lagrange multiplier test of residual serial correlation

B: Ramsey's RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

D: Based on the regression of squared residuals on squared fitted values

<table>
<thead>
<tr>
<th>Years</th>
<th>Broad money %gdp / Inflation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>20</td>
</tr>
<tr>
<td>1992</td>
<td>30</td>
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<tr>
<td>1994</td>
<td>40</td>
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<td>1996</td>
<td>50</td>
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<td>1998</td>
<td>60</td>
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<tr>
<td>2000</td>
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<td>2002</td>
<td>80</td>
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<td>2004</td>
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<td>2006</td>
<td>100</td>
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<tr>
<td>2008</td>
<td>110</td>
</tr>
<tr>
<td>2010</td>
<td>120</td>
</tr>
</tbody>
</table>

**P** Broad money %GDP

**Fitted**
Ordinary Least Squares Estimation

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>19.8293</td>
<td>3.9403</td>
<td>5.0324[.000]</td>
</tr>
<tr>
<td>V</td>
<td>-.75357</td>
<td>.65759</td>
<td>-1.1460[.266]</td>
</tr>
</tbody>
</table>

R-Squared                .064650   R-Bar-Squared                  .015421
S.E. of Regression        6.9976     F-stat. F( 1, 19)              1.3132[.266]
Mean of Dependent Variable 15.6667    S.D. of Dependent Variable      7.0522
Residual Sum of Squares   930.3616   Equation Log-likelihood       -69.6037
Akaike Info. Criterion    -71.6037   Schwarz Bayesian Criterion    -72.6483
DW-statistic              1.6896

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ(1)   =  .28150[.596]</td>
<td>F(1, 18) =  .24456[.627]</td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ(1)   =  .54875[.459]</td>
<td>F(1, 18) =  .48298[.496]</td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

* C: Normality
  CHSQ(2) = 35.3287[.000]
  Not applicable

* D: Heteroscedasticity
  CHSQ(1) = 3.7599[.052]
  F(1, 19) = 4.1437[.056]
Deposit interest / Inflation

Deposit interest rates

Fitted

Years

**LENDING INTEREST RATE -X-CON INFLATION CONSUMER PRICES (ANNUAL %)-V-**

Ordinary Least Squares Estimation

*******************************************************************************
**Dependent variable is X**

**21 observations used for estimation from 1990 to 2010**

*******************************************************************************

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>15.0488</td>
<td>.51463</td>
<td>29.2417[.000]</td>
</tr>
<tr>
<td>V</td>
<td>-.060555</td>
<td>.085886</td>
<td>-.70506[.489]</td>
</tr>
</tbody>
</table>

*******************************************************************************

<table>
<thead>
<tr>
<th>R-Squared</th>
<th>R-Bar-Squared</th>
<th>S.E. of Regression</th>
<th>F( 1, 19)</th>
<th>F-stat.</th>
<th>F( 1, 19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>.025497</td>
<td>-.025793</td>
<td>.91394</td>
<td>.49712[.489]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean of Dependent Variable | 14.7143 |
S.D. of Dependent Variable | .90238 |
Residual Sum of Squares | 15.8705 |
Equation Log-likelihood | -26.8571 |
Akaike Info. Criterion | -28.8571 |
Schwarz Bayesian Criterion | -29.9016 |
DW-statistic | .95575 |

*******************************************************************************

**Diagnostic Tests**

*******************************************************************************

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ( 1) = 3.8210[.051]</td>
<td>F( 1, 18) = 4.0036[.061]</td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ( 1) = .0041918[.948]</td>
<td>F( 1, 18) = .0035937[.953]</td>
</tr>
</tbody>
</table>

*******************************************************************************
**C:** Normality  \[ \chi^2(2) = 1.2557[.534] \]  Not applicable  

**D:** Heteroscedasticity  \[ \chi^2(1) = 3.2020[.074] \]  \[ F(1, 19) = 3.4182[.080] \]

*******************************************************************************

**A:** Lagrange multiplier test of residual serial correlation

**B:** Ramsey's RESET test using the square of the fitted values

**C:** Based on a test of skewness and kurtosis of residuals

**D:** Based on the regression of squared residuals on squared fitted values

---

Lending interest rate/Inflation

+ Lending interest rate
+ Fitted

Years

Ordinary Least Squares Estimation

Dependent variable is X

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>12.3279</td>
<td>.94789</td>
<td>13.0057[.000]</td>
</tr>
<tr>
<td>W</td>
<td>.28967</td>
<td>.11310</td>
<td>2.5612[.019]</td>
</tr>
</tbody>
</table>

R-Squared                     .25664   R-Bar-Squared                   .21752
S.E. of Regression            .79823   F-stat.    F(  1,  19)    6.5597[.019]
Mean of Dependent Variable    14.7143   S.D. of Dependent Variable      .90238
Residual Sum of Squares       12.1061   Equation Log-likelihood       -24.0142
Akaike Info. Criterion        -26.0142   Schwarz Bayesian Criterion    -27.0587
 DW-statistic                 1.0836

Diagnostic Tests

* Test Statistics *        LM Version        *         F Version          *

* A:Serial Correlation*CHSQ( 1)= 3.7104[.054]*F( 1, 18)= 3.8628[.065]*
* B:Functional Form *CHSQ( 1)= .71389[.398]*F( 1, 18)= .63344[.436]*
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

Lending interest rate/Deposit interest rate

Years


X lending interest rate

Fitted
Ordinary Least Squares Estimation

Dependent variable is O

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>758.7368</td>
<td>386.7619</td>
<td>1.9618[.065]</td>
</tr>
<tr>
<td>X</td>
<td>-25.5614</td>
<td>26.2378</td>
<td>-.97422[.342]</td>
</tr>
</tbody>
</table>

R-Squared \(=.047576\) R-Bar-Squared \(-.0025513\)

S.E. of Regression \(=105.8843\) F-stat. \(F( 1, 19) = .94910[.342]\)

Mean of Dependent Variable \(=382.6190\) S.D. of Dependent Variable \(=105.7495\)

Residual Sum of Squares \(=213018.1\) Equation Log-likelihood \(-126.6561\)

Akaike Info. Criterion \(-128.6561\) Schwarz Bayesian Criterion \(-129.7006\)

DW-statistic \(=.083002\)

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A:Serial Correlation \(CHSQ( 1) = 19.3134[.000]*\) \(F( 1, 18) = 206.1217[.000]*\)

B:Functional Form \(CHSQ( 1) = 8.1625[.004]*\) \(F( 1, 18) = 11.4449[.003]*\)
C: Normality

\[
\chi^2(2) = 4.2510^{[.119]}
\]
Not applicable

D: Heteroscedasticity

\[
\chi^2(1) = 1.6716^{[.196]}
\]
\[
F(1, 19) = 1.6432^{[.215]}
\]

A: Lagrange multiplier test of residual serial correlation

B: Ramsey's RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

D: Based on the regression of squared residuals on squared fitted values

---

GDP capita / lending interest rate

Years


GDP capita / lending interest rate

- O capita
- gdp
- Fitted
Ordinary Least Squares Estimation

Dependent variable is K

10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>14.2264</td>
<td>25.7014</td>
<td>.55353[.595]</td>
</tr>
<tr>
<td>C</td>
<td>.83962</td>
<td>.92863</td>
<td>.90415[.392]</td>
</tr>
</tbody>
</table>

R-Squared                    .092713   R-Bar-Squared                 -.020698
S.E. of Regression            6.0468   F-stat.    F(  1,   8)    .81749[.392]
Mean of Dependent Variable   37.4000   S.D. of Dependent Variable      5.9852
Residual Sum of Squares     292.5094   Equation Log-likelihood       -31.0689
Akaike Info. Criterion      -33.0689   Schwarz Bayesian Criterion    -33.3715
DW-statistic                  .37037

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation

primary teachers % female / taxes goods sevices

K
Fitted

Years

---

A: Serial Correlation
CHSQ(1) = 6.0143(0.014)
F(1, 7) = 10.5629(0.014)

B: Functional Form
CHSQ(1) = 4.8784(0.027)
F(1, 7) = 6.6677(0.036)

C: Normality
CHSQ(2) = 0.25022(0.882)
Not applicable

D: Heteroscedasticity
CHSQ(1) = 3.4124(0.065)
F(1, 8) = 4.1439(0.076)

---

A: Lagrange multiplier test of residual serial correlation
Ordinary Least Squares Estimation

Dependent variable is L
10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>48.8679</td>
<td>3.0002</td>
<td>16.2883 [.000]</td>
</tr>
<tr>
<td>C</td>
<td>.051887</td>
<td>.10840</td>
<td>.47866 [.645]</td>
</tr>
</tbody>
</table>

R-Squared: .027842  R-Bar-Squared: -.093678
S.E. of Regression: .70585  F-stat. F( 1, 8) = .22911 [.645]
Mean of Dependent Variable: 50.3000  S.D. of Dependent Variable: .67495
Residual Sum of Squares: 3.9858  Equation Log-likelihood: -9.5902
Akaike Info. Criterion: -11.5902  Schwarz Bayesian Criterion: -11.8928
DW-statistic: 2.1237

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ(1) = .16796 [.682]</td>
<td>F(1, 7) = .11958 [.740]</td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ(1) = 1.2906 [.256]</td>
<td>F(1, 7) = 1.0373 [.342]</td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey’s RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
Ordinary Least Squares Estimation

Dependent variable is M

10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>50.8302</td>
<td>4.2766</td>
<td>11.8855 [.000]</td>
</tr>
<tr>
<td>C</td>
<td>-.0047170</td>
<td>.15452</td>
<td>-.030526 [.976]</td>
</tr>
</tbody>
</table>

R-Squared                   .1165E-3   R-Bar-Squared                  -.12487
S.E. of Regression            1.0062   F-stat.    F(  1,   8)  .9319E-3 [.976]
Mean of Dependent Variable   50.7000   S.D. of Dependent Variable      .94868
Residual Sum of Squares       8.0991   Equation Log-likelihood       -13.1352
Akaike Info. Criterion      -15.1352   Schwarz Bayesian Criterion    -15.4378
DW-statistic                  1.3642

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>* A: Serial Correlation</td>
<td>CHSQ(1) = .57421 [.449]</td>
<td>F(1, 7) = .42643 [.535]</td>
</tr>
<tr>
<td>* B: Functional Form</td>
<td>CHSQ(1) = <em>NONE</em></td>
<td>F(1, 7) = <em>NONE</em></td>
</tr>
</tbody>
</table>
Ordinary Least Squares Estimation

Dependent variable is N
10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>25.0566</td>
<td>10.2026</td>
<td>2.4559 [.040]</td>
</tr>
<tr>
<td>C</td>
<td>.084906</td>
<td>.36863</td>
<td>.23032 [.824]</td>
</tr>
</tbody>
</table>

R-Squared                      .0065875   R-Bar-Squared                -.11759
S.E. of Regression             2.4004      F-stat. F( 1, 8) .053050 [.824]
Mean of Dependent Variable     27.4000     S.D. of Dependent Variable     2.2706
Residual Sum of Squares        46.0943     Equation Log-likelihood       -21.8299
Akaike Info. Criterion       -23.8299   Schwarz Bayesian Criterion    -24.1325
DW-statistic               .74545

*******************************************************************************
*  Test Statistics  *    LM Version      *        F Version          *
*******************************************************************************

*                     *                          *                            *
A:Serial Correlation  *CHSQ(  1)=   2.8209[.093]*F(  1,  7)=   2.7505[.141]*
*                     *                          *                            *
* B:Functional Form   *CHSQ(  1)=   3.5350[.060]*F(  1,  7)=   3.8275[.091]*
*                     *                          *                            *
* C:Normality         *CHSQ(  2)=   1.0216[.600]*       Not applicable       *
*                     *                          *                            *
* D:Heteroscedasticity*CHSQ(  1)= .0075447[.931]*F(  1,  8)= .0060403[.940]*
*******************************************************************************

A: Lagrange multiplier test of residual serial correlation
B: Ramsey’s RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

 secondary education vocational pupils % female/taxes goods services

![Graph showing years 2001 to 2010 with fitted and N lines]

Years

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

20 25 30 35

N
Fitted

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Ordinary Least Squares Estimation

Dependent variable is O

10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>43.7642</td>
<td>10.0463</td>
<td>4.3562 [.002]</td>
</tr>
<tr>
<td>C</td>
<td>.14623</td>
<td>.36299</td>
<td>.40284 [.698]</td>
</tr>
</tbody>
</table>

R-Squared                    .019882  R-Bar-Squared                  -.10263
S.E. of Regression            2.3636  F-stat.    F(  1,   8)    .16228 [.698]
Mean of Dependent Variable   47.8000  S.D. of Dependent Variable      2.2509
Residual Sum of Squares      44.6934  Equation Log-likelihood       -21.6756
Akaike Info. Criterion      -23.6756  Schwarz Bayesian Criterion    -23.9782
DW-statistic                 .84178

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ( 1) = 2.6554 (.103)</td>
<td>F( 1, 7) = 2.5309 (.156)</td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ( 1) = 3.0083 (.083)</td>
<td>F( 1, 7) = 3.0118 (.126)</td>
</tr>
<tr>
<td>C:Normality</td>
<td>CHSQ( 2) = 1.1056 (.575)</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

school enrollment secondary gross/taxes goods services

Years

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

O

Fitted
Ordinary Least Squares Estimation

Dependent variable is P

10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>44.9528</td>
<td>12.5313</td>
<td>3.5872 [.007]</td>
</tr>
<tr>
<td>C</td>
<td>.17925</td>
<td>.45277</td>
<td>.39588 [.703]</td>
</tr>
</tbody>
</table>

R-Squared                    .019214   R-Bar-Squared                  -.10338
S.E. of Regression            2.9483   F-stat.    F(  1,   8)    .15672 [.703]
Mean of Dependent Variable   49.9000   S.D. of Dependent Variable      2.8067
Residual Sum of Squares      69.5377   Equation Log-likelihood       -23.8858
Akaike Info. Criterion       -25.8858   Schwarz Bayesian Criterion    -26.1884
DW-statistic                  .71629

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics *</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation*CHSQ( 1)  = 3.7434 [.053]<em>F( 1, 7) = 4.1881 [.080]</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B:Functional Form  *CHSQ( 1)  = 3.3328 [.068]<em>F( 1, 7) = 3.4992 [.104]</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

**school enrolment secondary female /taxes on goods services**

![Graph showing school enrolment and fitted values over years](image)
Ordinary Least Squares Estimation

Dependent variable is PR

10 observations used for estimation from 2001 to 2010

Regressor | Coefficient | Standard Error | T-Ratio [Prob]
--- | --- | --- | ---
CON | 45.8302 | 8.5140 | 5.3829 [.001]
C | -.0047170 | .30762 | -.015334 [.988]

R-Squared: .2939E-4, R-Bar-Squared: -.12497
S.E. of Regression: 2.0031, F-stat: F( 1, 8) = .2351E-3 [.988]
Mean of Dependent Variable: 45.7000, S.D. of Dependent Variable: 1.8886
Residual Sum of Squares: 32.0991, Equation Log-likelihood: -20.0206
Akaike Info. Criterion: -22.0206, Schwarz Bayesian Criterion: -22.3232
DW-statistic: 1.3109

Diagnostic Tests

** Test Statistics ** | LM Version | ** F Version **
--- | --- | ---
A:Serial Correlation | CHSQ( 1) = .93846[.333] | F( 1, 7) = .72496[.423]
B:Functional Form | *NONE* | *NONE*

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A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

Ordinary Least Squares Estimation

Dependent variable is R
10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>43.0472</td>
<td>7.9216</td>
<td>5.4341[.001]</td>
</tr>
<tr>
<td>C</td>
<td>.070755</td>
<td>.28622</td>
<td>.24720[.811]</td>
</tr>
</tbody>
</table>

R-Squared .0075809 R-Bar-Squared -.11647
S.E. of Regression 1.8637 F-stat. F{ 1, 8} .061110[.811]
Mean of Dependent Variable 45.0000 S.D. of Dependent Variable 1.7638
Residual Sum of Squares 27.7877 Equation Log-likelihood -19.2994
Akaike Info. Criterion -21.2994 Schwarz Bayesian Criterion -21.6020
DW-statistic .68195

Diagnostic Tests
A: Serial Correlation
*CHSQ(1) = 3.8838[.049] F(1, 7) = 4.4450[.073]*

B: Functional Form
*CHSQ(1) = 3.8896[.049] F(1, 7) = 4.4560[.073]*

C: Normality
*CHSQ(2) = .67824[.712] Not applicable *

D: Heteroscedasticity
*CHSQ(1) = .037637[.846] F(1, 8) = .030223[.866]*

A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
Ordinary Least Squares Estimation

Dependent variable is C

10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>22.7786</td>
<td>19.5173</td>
<td>1.1671 [0.277]</td>
</tr>
<tr>
<td>R</td>
<td>0.10714</td>
<td>0.43342</td>
<td>0.24720 [0.811]</td>
</tr>
</tbody>
</table>

| R-Squared         | 0.0075809 | R-Bar-Squared | -0.11647 |
| S.E. of Regression| 2.2934    | F-stat ( 1, 8) | 0.06110 [0.811] |
| Mean of Dependent Variable | 27.6000 | S.D. of Dependent Variable | 2.1705 |
| Residual Sum of Squares | 42.0786 | Equation Log-likelihood | -21.3742 |
| Akaike Info. Criterion | -23.3742 | Schwarz Bayesian Criterion | -23.6767 |
| DW-statistic      | 1.6065    |                |          |

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ( 1) = 0.0040805[0.949] F( 1, 7) = 0.0028575[0.959]</td>
<td></td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ( 1) = 0.20660[0.649] F( 1, 7) = 0.14767[0.712]</td>
<td></td>
</tr>
</tbody>
</table>
C: Normality  \( \chi^2 = 0.012763 \)  Not applicable

D: Heteroscedasticity  \( \chi^2 = 4.0523 \)  \( F(1, 8) = 5.4506 \)

A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

Taxes goods services/School enrolment secondary

<table>
<thead>
<tr>
<th>Years</th>
<th>Taxes goods services</th>
<th>Fitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td></td>
<td></td>
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<tr>
<td>2004</td>
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<td></td>
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<tr>
<td>2005</td>
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<tr>
<td>2006</td>
<td></td>
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<tr>
<td>2007</td>
<td></td>
<td></td>
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<tr>
<td>2008</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

20  25  30  35
Ordinary Least Squares Estimation

*********************************************************************************************
Dependent variable is S
10 observations used for estimation from 2001 to 2010
*********************************************************************************************

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>44.2264</td>
<td>9.9408</td>
<td>4.4490 [.002]</td>
</tr>
<tr>
<td>C</td>
<td>.089623</td>
<td>.35918</td>
<td>.24952 [.809]</td>
</tr>
</tbody>
</table>

*********************************************************************************************

R-Squared                  .0077226   R-Bar-Squared                  -.11631
S.E. of Regression          2.3388     F-stat.  F(  1,   8)   .062262 [.809]
Mean of Dependent Variable  46.7000     S.D. of Dependent Variable       2.2136
Residual Sum of Squares   43.7594     Equation Log-likelihood       -21.5700
Akaike Info. Criterion    -23.5700     Schwarz Bayesian Criterion    -23.8726
DW-statistic              .77901

*********************************************************************************************

Diagnostic Tests

*********************************************************************************************
* Test Statistics *        LM Version        *         F Version          *
*********************************************************************************************
*                     *                          *                            *
* A:Serial Correlation  *CHSQ(   1)=   3.0679 [.080]*F(   1,   8)=   3.0979 [.122] *
*                     *                          *                            *
* B:Functional Form    *CHSQ(   1)=   3.5789 [.059]*F(   1,   7)=   3.9016 [.089] *
*                     *                          *                            *
* C: Normality  \[\text{CHSQ}(2) = 0.96276[0.618]\]  Not applicable  

* D: Heteroscedasticity  \[\text{CHSQ}(1) = 0.059563[0.807]\] \[F(1, 8) = 0.047936[0.832]\]

*******************************************************************************
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

School enrolments secondary female/Taxes goods services

![Graph showing school enrolments secondary female and fitted values over years from 2001 to 2010.](image-url)
Ordinary Least Squares Estimation

Dependent variable is T

10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>44.6321</td>
<td>5.0929</td>
<td>8.7635 [.000]</td>
</tr>
<tr>
<td>C</td>
<td>-.051887</td>
<td>.18402</td>
<td>-.28197 [.785]</td>
</tr>
</tbody>
</table>

R-Squared                   .0098406   R-Bar-Squared                  -.11393
S.E. of Regression            1.1982   F-stat.    F(  1,   8)   .079507[.785]
Mean of Dependent Variable   43.2000   S.D. of Dependent Variable      1.1353
Residual Sum of Squares      11.4858   Equation Log-likelihood       -14.8820
Akaike Info. Criterion      -16.8820   Schwarz Bayesian Criterion    -17.1846
DW-statistic                  .90535

School enrolment second male/Taxes goods services

Secondary school male

Fitted
Ordinary Least Squares Estimation

Dependent variable is C

10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>302.3333</td>
<td>209.3437</td>
<td>1.4442 [.187]</td>
</tr>
<tr>
<td>U</td>
<td>-2.8889</td>
<td>2.2013</td>
<td>-1.3124 [.226]</td>
</tr>
</tbody>
</table>

R-Squared                      .17715   R-Bar-Squared                  .074292
S.E. of Regression             2.0883   F-stat. F( 1, 8) 1.7223 [.226]
Mean of Dependent Variable     27.6000   S.D. of Dependent Variable 2.1705
Residual Sum of Squares        34.8889   Equation Log-likelihood -20.4373
Akaike Info. Criterion         -22.4373   Schwarz Bayesian Criterion -22.7399
DW-statistic                   1.5198

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation*CHSQ(1) = .6328E-3(.980)<em>F(1, 7) = .4430E-3(.984)</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

181
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

Enrolment private school / Taxes goods services

Years

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

20 25 30 35

Taxes goods services

Fitted
Ordinary Least Squares Estimation

Dependent variable is C
10 observations used for estimation from 2001 to 2010

Regressor              Coefficient       Standard Error         T-Ratio[Prob]
CON                       19.1719             5.7728             3.3211[.011]
V                          .48438             .32969             1.4692[.180]

R-Squared                     .21249   R-Bar-Squared                   .11405
S.E. of Regression            2.0430   F-stat.    F(  1,   8)    2.1585[.180]
Mean of Dependent Variable   27.6000   S.D. of Dependent Variable      2.1705
Residual Sum of Squares      33.3906   Equation Log-likelihood       -20.2178
Akaike Info. Criterion      -22.2178   Schwarz Bayesian Criterion    -22.5204
DW-statistic                  1.9566

Diagnostic Tests

* Test Statistics *           LM Version       *       F Version       *

*                                 *                                 *                                 *
* A:Serial Correlation*CHSQ(1)=  .017809[.894]*F(  1,   7)=  .012489[.914]*
*                                 *                                 *                                 *
* B:Functional Form  *CHSQ(1)=  4.0078[.045]*F(  1,   7)=  4.6819[.067]*
*                                 *                                 *                                 *
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

**Taxes goods services Secondary education teachers female**

![Graph showing taxes goods services and fitted values from 2001 to 2010]
### Ordinary Least Squares Estimation

**Dependent variable is W**

10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>2.1226</td>
<td>8.5227</td>
<td>.24906 [.810]</td>
</tr>
<tr>
<td>C</td>
<td>.18396</td>
<td>.30794</td>
<td>.59740 [.567]</td>
</tr>
</tbody>
</table>

- **R-Squared**: .042706
- **R-Bar-Squared**: - .076956
- **S.E. of Regression**: 2.0052
- **F-stat. F(1, 8)**: 22.6419 [.002]
- **Mean of Dependent Variable**: 7.2000
- **S.D. of Dependent Variable**: 1.9322
- **Residual Sum of Squares**: 32.1651
- **Equation Log-likelihood**: -20.0309
- **Akaike Info. Criterion**: -22.0309
- **Schwarz Bayesian Criterion**: -22.3335
- **DW-statistic**: .28588

### Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Serial Correlation</td>
<td>CHSQ(1) = 7.6385 [.006] *F(1, 7) = 22.6419 [.002]</td>
<td></td>
</tr>
<tr>
<td>B: Functional Form</td>
<td>CHSQ(1) = 1.4976 [.221] *F(1, 7) = 1.2329 [.304]</td>
<td></td>
</tr>
</tbody>
</table>
* C: Normality  \text{CHSQ}(2) = 1.0642[.587]*  Not applicable  *
* * * * *

* D: Heteroscedasticity \text{CHSQ}(1) = 2.0021[.157]* \text{F}(1,8) = 2.0026[.195]*

******************************************************************************

A: Lagrange multiplier test of residual serial correlation
B: Ramsey’s RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted value

---

![Graph showing school enrollment and taxes over years]


**School enrollment tertiary Taxes goods services**

- **School enrolm tertiary**
- **Fitted**
Ordinary Least Squares Estimation

Dependent variable is X
10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>1.0943</td>
<td>6.9112</td>
<td>.15834[.878]</td>
</tr>
<tr>
<td>C</td>
<td>.14151</td>
<td>.24971</td>
<td>.56669[.586]</td>
</tr>
</tbody>
</table>

R-Squared                    .038593   R-Bar-Squared                 -.081582
S.E. of Regression            1.6260   F-stat.    F(  1,   8)    .32114[.586]
Mean of Dependent Variable    5.0000   S.D. of Dependent Variable      1.5635
Residual Sum of Squares      21.1509   Equation Log-likelihood       -17.9349
Akaike Info. Criterion      -19.9349   Schwarz Bayesian Criterion    -20.2375
DW-statistic                  .28399

Diagnostic Tests

* Test Statistics *    LM Version    *    F Version    *
*                        *                          *                            *
* A:Serial Correlation*CHSQ(  1)= 7.5629[.006]*F(  1,   7)= 21.7229[.002]*
*                        *                          *                            *
* B:Functional Form  *CHSQ(  1)= 1.5777[.209]*F(  1,   7)= 1.3113[.290]*
*                        *                          *                            *
* C:Normality  *CHSQ(  2)= .68232[.711]*  Not applicable  *
*                          *
* D:Heteroscedasticity*CHSQ(  1)= 2.0037[.157]*F(  1,  8)= 2.0046[.195]*
*******************************************************************************

A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals

School enrollment tertiary female/Taxes goods services

Tertiary-female enrollment

Fitted
Ordinary Least Squares Estimation

Dependent variable is Y
10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>3.6415</td>
<td>10.4751</td>
<td>.34763 [.737]</td>
</tr>
<tr>
<td>C</td>
<td>.21226</td>
<td>.37848</td>
<td>.56083 [.590]</td>
</tr>
</tbody>
</table>

R-Squared       .037829  R-Bar-Squared  -.082442
S.E. of Regression 2.4645   F-stat. F( 1, 8) .31453 [.590]
Mean of Dependent Variable 9.5000   S.D. of Dependent Variable 2.3688
Residual Sum of Squares 48.5896   Equation Log-likelihood -22.0935
Akaike Info. Criterion -24.0935   Schwarz Bayesian Criterion -24.3961
DW-statistic .26912

Diagnostic Tests

* Test Statistics * LM Version * F Version *

A:Serial Correlation * CHSQ(1) = 7.7311 [.005] * F(1, 7) = 23.8525 [.002]*
B:Functional Form * CHSQ(1) = 1.5453 [.214] * F(1, 7) = 1.2794 [.295]*
* C: Normality  \( \text{CHSQ}(2) = 1.2001[.549] \) Not applicable *

* D: Heteroscedasticity \( \text{CHSQ}(1) = 1.9909[.158] \) \( F(1, 8) = 1.9887[.196] \)*

*******************************************************************************

A: Lagrange multiplier test of residual serial correlation

B: Ramsey's RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

D: Based on the regression of squared residuals on squared fitted values
### Ordinary Least Squares Estimation

**Dependent variable is Z**

10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>38.1132</td>
<td>10.4792</td>
<td>3.6370 [.007]</td>
</tr>
<tr>
<td>C</td>
<td>.41981</td>
<td>.37863</td>
<td>1.1088 [.300]</td>
</tr>
</tbody>
</table>

- **R-Squared**: .13320
- **R-Bar-Squared**: .024852
- **S.E. of Regression**: 2.4654
- **F-stat. F( 1, 8)**: 1.2294 [.300]
- **Mean of Dependent Variable**: 49.7000
- **S.D. of Dependent Variable**: 2.4967
- **Residual Sum of Squares**: 48.6274
- **Equation Log-likelihood**: -22.0974
- **Akaike Info. Criterion**: -24.0974
- **Schwarz Bayesian Criterion**: -24.4000
- **DW-statistic**: .26315

### Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ( 1) = 6.6650 [.010] F( 1, 7) = 13.9892 [.007]</td>
<td></td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ( 1) = 5.2916 [.021] F( 1, 7) = 7.8672 [.026]</td>
<td></td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

Improved sanitation facilities / Taxes goods services

Years

Improved sanitation facilities
Fitted
**Ordinary Least Squares Estimation**

Dependent variable is AA

10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>33.0283</td>
<td>14.8403</td>
<td>2.2256 [.057]</td>
</tr>
<tr>
<td>C</td>
<td>.54245</td>
<td>.53620</td>
<td>1.0117 [.341]</td>
</tr>
</tbody>
</table>

R-Squared: .11342  R-Bar-Squared: .0025997

S.E. of Regression: 3.4915  F-stat: F( 1, 8) = 1.0235 [.341]

Mean of Dependent Variable: 48.0000  S.D. of Dependent Variable: 3.4960

Residual Sum of Squares: 97.5236  Equation Log-likelihood: -25.5769

Akaike Info. Criterion: -27.5769  Schwarz Bayesian Criterion: -27.8795

DW-statistic: .27053

**Diagnostic Tests**

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>IM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation*CHSQ( 1)= 6.5959 [.010]<em>F( 1, 7)= 13.5633 [.008]</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B:Functional Form*CHSQ( 1)= 5.8750 [.015]<em>F( 1, 7)= 9.9697 [.016]</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey’s RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

**Improved sanitation rural/Taxes goods services**

![Graph showing improved sanitation and fitted values over years from 2001 to 2010]
Ordinary Least Squares Estimation

Dependent variable is C
10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-19.2857</td>
<td>85.3065</td>
<td>-.22608[.827]</td>
</tr>
<tr>
<td>AB</td>
<td>.85714</td>
<td>1.5595</td>
<td>.54963[.598]</td>
</tr>
</tbody>
</table>

R-Squared                     .036388   R-Bar-Squared                 -.084063
S.E. of Regression           2.2599    F-stat.  F(  1,   8)    .30210[.598]
Mean of Dependent Variable   27.6000    S.D. of Dependent Variable  2.1705
Residual Sum of Squares      40.8571    Equation Log-likelihood       -21.2269
Akaike Info. Criterion       -23.2269   Schwarz Bayesian Criterion    -23.5295
DW-statistic                 1.9236

Diagnostic Tests

* Test Statistics *     IM Version     *     F Version     *

* A:Serial Correlation*CHSQ(  1)= .10854[.742]*F(  1,   7)= .076811[.790]*
* B:Functional Form *CHSQ(  1)= *NONE*     *F(  1,   7)= *NONE*     *
A: Lagrange multiplier test of residual serial correlation

B: Ramsey’s RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

D: Based on the regression of squared residuals on squared fitted values

Taxes/Improved sanitation urban

Years

Taxes goods services

Fitted
Ordinary Least Squares Estimation

Dependent variable is C
10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>15.0639</td>
<td>11.2819</td>
<td>1.3352 [.219]</td>
</tr>
<tr>
<td>AC</td>
<td>.1874E-6</td>
<td>.1683E-6</td>
<td>1.1132 [.298]</td>
</tr>
</tbody>
</table>

R-Squared                     .13412   R-Bar-Squared                  .025886
S.E. of Regression            2.1422   F-stat.   F(  1,   8)    1.2392 [.298]
Mean of Dependent Variable   27.6000   S.D. of Dependent Variable      2.1705
Residual Sum of Squares      36.7133   Equation Log-likelihood       -20.6921
Akaike Info. Criterion      -22.6921   Schwarz Bayesian Criterion    -22.9947
DW-statistic                  1.8747

Diagnostic Tests

* Test Statistics *   LM Version *   F Version *
*                *               *                *
* A:Serial Correlation*CHSQ(  1)= .0023383[.961]*F(  1,   7)= .0016372[.969]*
* B: Functional Form  *CHSQ( 1) = 1.1866[.276]*F( 1, 7) = .94246[.364]*

* C: Normality  *CHSQ( 2) = 5.8808[.053]*  Not applicable *

---

Taxes goods services/ Labour force total

![Taxes goods services/ Labour force total graph]

- **Taxes goods services**
- **Fitted**

---

Years

- 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

---

20 25 30 35
Ordinary Least Squares Estimation

Dependent variable is E

10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>59.1781</td>
<td>14.0359</td>
<td>4.2162 [.003]</td>
</tr>
<tr>
<td>AC</td>
<td>-.4661E-6</td>
<td>.2094E-6</td>
<td>-2.2253 [.057]</td>
</tr>
</tbody>
</table>

R-Squared                     .38234   R-Bar-Squared                   .30513
S.E. of Regression            2.6652   F-stat.    F(  1,   8)    4.9521 [.057]
Mean of Dependent Variable   28.0000   S.D. of Dependent Variable      3.1972
Residual Sum of Squares      56.8248   Equation Log-likelihood       -22.8763
Akaike Info. Criterion      -24.8763   Schwarz Bayesian Criterion    -25.1789
DW-statistic                  1.4465

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ( 1)= 0.72974 [.393]</td>
<td>F( 1, 7)= 0.55103 [.482]</td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ( 1)= 2.1808 [.140]</td>
<td>F( 1, 7)= 1.9523 [.205]</td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey’s RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

Taxes international trade/Labour force

Taxes on international trade
Fitted

Years

Taxes international trade/Labour force

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
Ordinary Least Squares Estimation

Dependent variable is G

10 observations used for estimation from 2001 to 2010

Regressor  Coefficient  Standard Error  T-Ratio[Prob]
CON        .58981       1.8303         .32225[.756]
AC         .1093E-6     .2731E-7        4.0012[.004]

R-Squared                     .66680   R-Bar-Squared                   .62515
S.E. of Regression            .34754   F-stat.  F( 1,  8) 16.0097[.004]
Mean of Dependent Variable    7.9000   S.D. of Dependent Variable      .56765
Residual Sum of Squares       .96628   Equation Log-likelihood        -2.5049
Akaike Info. Criterion        -4.5049   Schwarz Bayesian Criterion     -4.8075
DW-statistic                  1.6230

Diagnostic Tests

Test Statistics  IM Version  F Version
A:Serial Correlation*CHSQ( 1)=  .084652[.771]*F( 1,  7)=  .059762[.814]*
B:Functional Form  *CHSQ( 1)=  .24553[.620]*F( 1,  7)=  .17620[.687]*

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* C: Normality  \*CHSQ(2) = 0.90035[.638]  Not applicable *
*                                                                                           *
* D: Heteroscedasticity*CHSQ(1) = 0.18616[.666]*F(1, 8) = 0.15175[.707]*
*******************************************************************************
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
Ordinary Least Squares Estimation

Dependent variable is M
10 observations used for estimation from 2001 to 2010

Regressor                  Coefficient       Standard Error         T-Ratio\[Prob\]
CON                       46.0572             5.0376             9.1426\[.000\]
AC                       .6941E-7           .7517E-7             .92330\[.383\]

R-Squared                    .096298   R-Bar-Squared                 -.016665
S.E. of Regression            .95656   F-stat.    F(  1,   8)    .85247\[.383\]
Mean of Dependent Variable   50.7000   S.D. of Dependent Variable      .94868
Residual Sum of Squares       7.3200   Equation Log-likelihood       -12.6295
Akaike Info. Criterion      -14.6295   Schwarz Bayesian Criterion    -14.9321
DW-statistic                  1.4869

Diagnostic Tests

* Test Statistics *         LM Version             *   F Version       *

* A:Serial Correlation*CHSQ( 1)= .32572\{.568\}*F( 1,  7)= .23568\{.642\}*
* B:Functional Form  *CHSQ( 1)= 5.1520\{.023\}*F( 1,  7)= 7.4389\{.029\}*


A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
Ordinary Least Squares Estimation

Dependent variable is \( I \)
10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-44.1446</td>
<td>9.8809</td>
<td>-4.4677 [.002]</td>
</tr>
<tr>
<td>AC</td>
<td>.9454E-6</td>
<td>.1474E-6</td>
<td>6.4123 [.000]</td>
</tr>
</tbody>
</table>

R-Squared: .83712
R-Bar-Squared: .81676
S.E. of Regression: 1.8762
F-stat: F( 1, 8) 41.1170 [.000]
Mean of Dependent Variable: 19.1000
S.D. of Dependent Variable: 4.3830
Residual Sum of Squares: 28.1613
Equation Log-likelihood: -19.3662
Akaike Info. Criterion: -21.3662
Schwarz Bayesian Criterion: -21.6688
DW-statistic: .67261

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ( 1) = 3.4678 [.063] F( 1, 7) = 3.7161 [.095]</td>
<td></td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ( 1) = 4.3815 [.036] F( 1, 7) = 5.4588 [.052]</td>
<td></td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

Taxes on income, profits, capital gains / Labour force

Taxes capital gains, profits
Fitted

Years 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

**C: Normality**
\[ CHSQ(2) = 1.1087\{.574\} \]
Not applicable

**D: Heteroscedasticity**
\[ CHSQ(1) = 1.8847\{.170\} \]
\[ F(1,8) = 1.8579\{.210\} \]
Ordinary Least Squares Estimation

Dependent variable is J

10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-7.81E+09</td>
<td>1.55E+09</td>
<td>-5.0285[.001]</td>
</tr>
<tr>
<td>AC</td>
<td>152.9917</td>
<td>23.1705</td>
<td>6.6029[.000]</td>
</tr>
</tbody>
</table>

R-Squared                     .84495   R-Bar-Squared                   .82557
S.E. of Regression          2.95E+08   F-stat.    F(  1,   8)   43.5979[.000]
Mean of Dependent Variable  2.43E+09   S.D. of Dependent Variable    7.06E+08
Residual Sum of Squares     6.95E+17   Equation Log-likelihood      -208.0933
Akaike Info. Criterion     -210.0933   Schwarz Bayesian Criterion   -210.3959
DW-statistic                  1.2793

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ( 1) = .44071[.507]</td>
<td>F( 1, 7) = .32272[.588]</td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ( 1) = 3.3798[.066]</td>
<td>F( 1, 7) = 3.5738[.101]</td>
</tr>
</tbody>
</table>


A: Lagrange multiplier test of residual serial correlation
B: Ramsey’s RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

Net taxes on products / Labour force

Net taxes on products
Fitted

<table>
<thead>
<tr>
<th>Years</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.0e+09</td>
<td>1.5e+09</td>
<td>2.0e+09</td>
<td>2.5e+09</td>
<td>3.0e+09</td>
<td>3.5e+09</td>
<td>4.0e+09</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C: Normality
CHSQ(2) = 0.067116[0.967] Not applicable

D: Heteroscedasticity
CHSQ(1) = 3.3728[0.066] F(1, 8) = 4.0714[0.078]
Ordinary Least Squares Estimation

Dependent variable is H
10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-6.9609</td>
<td>2.6169</td>
<td>-2.6600[.029]</td>
</tr>
<tr>
<td>K</td>
<td>.57382</td>
<td>.069178</td>
<td>8.2948[.000]</td>
</tr>
</tbody>
</table>

R-Squared                     .89584   R-Bar-Squared                   .88282
S.E. of Regression            1.2421   F-stat.    F(  1,   8)   68.8043[.000]
Mean of Dependent Variable    14.5000   S.D. of Dependent Variable      3.6286
Residual Sum of Squares      12.3431   Equation Log-likelihood       -15.2419
Akaike Info. Criterion      -17.2419   Schwarz Bayesian Criterion    -17.5445
DW-statistic                  1.2517

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ( 1)= 1.1768[.278]</td>
<td>F( 1, 7)= .93363[.366]</td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ( 1)= .24920[.618]</td>
<td>F( 1, 7)= .17890[.685]</td>
</tr>
</tbody>
</table>


A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

taxes on income profit/ Primary teachers female

<table>
<thead>
<tr>
<th>Years</th>
<th>Fitted</th>
<th>Tax profit income</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td></td>
<td></td>
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<tr>
<td>2004</td>
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<td>2005</td>
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<td>2006</td>
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<tr>
<td>2007</td>
<td></td>
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<tr>
<td>2008</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TAXES ON INCOME PROFITS AND CAPITAL GAINS (% OF REVENUE) - H-CON SECONDARY EDUCATION PUPILS (% FEMALE) - L -

Ordinary Least Squares Estimation

Dependent variable is H
10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-40.7073</td>
<td>93.6011</td>
<td>-.43490[.675]</td>
</tr>
<tr>
<td>L</td>
<td>1.0976</td>
<td>1.8607</td>
<td>.58986[.572]</td>
</tr>
</tbody>
</table>

R-Squared                    .041680   R-Bar-Squared                 -.078111
S.E. of Regression            3.7676   F-stat.    F(  1,   8)    .34794[.572]
Mean of Dependent Variable 14.5000   S.D. of Dependent Variable 3.6286
Residual Sum of Squares 113.5610   Equation Log-likelihood -26.3382
DW-statistic                .26450

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation*CHSQ( 1) = 7.4203(.006)<em>F( 1, 7) = 20.1349(.003)</em></td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

211
* B: Functional Form  \( \chi^2(1) = 0.20790(0.648) \ F(1, 7) = 0.14862(0.711) \)  
* C: Normality  \( \chi^2(2) = 0.96401(0.618) \)  Not applicable  
* D: Heteroscedasticity  \( \chi^2(1) = 3.5382(0.060) \ F(1, 8) = 4.3804(0.070) \)  

A: Lagrange multiplier test of residual serial correlation  
B: Ramsey's RESET test using the square of the fitted values  
C: Based on a test of skewness and kurtosis of residuals  
D: Based on the regression of squared residuals on squared fitted values
## Ordinary Least Squares Estimation

Dependent variable is \( H \)

10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-76.2593</td>
<td>60.5984</td>
<td>-1.2584 [0.244]</td>
</tr>
<tr>
<td>M</td>
<td>1.7901</td>
<td>1.1950</td>
<td>1.4980 [0.173]</td>
</tr>
</tbody>
</table>

R-Squared: \( 0.21904 \)

R-Bar-Squared: \( 0.12143 \)

S.E. of Regression: \( 3.4012 \)

Equation Log-likelihood: -25.3148

Akaike Info. Criterion: -27.3148

Schwarz Bayesian Criterion: -27.6174

DW-statistic: 0.56460

### Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation CHSQ( 1) = 5.6224 (.018)</td>
<td>F( 1, 7) = 8.9905 (.020)</td>
<td></td>
</tr>
</tbody>
</table>

213
* B: Functional Form \[*\text{CHSQ}(1) = 1.2914[.256]\]* \[*\text{F}(1, 7) = 1.0380[.342]\]*

* C: Normality \[*\text{CHSQ}(2) = .90009[.638]\]* Not applicable 

* D: Heteroscedasticity \[*\text{CHSQ}(1) = 1.0105[.315]\]* \[*\text{F}(1, 8) = .89927[.371]\]*

*******************************************************************************

A: Lagrange multiplier test of residual serial correlation

B: Ramsey's RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

D: Based on the regression of squared residuals on squared fitted values

Taxes on income / Secondary education general

Tax on income

Fitted

Years

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

25

20

15

10
Ordinary Least Squares Estimation

Dependent variable is \( H \)

10 observations used for estimation from 2001 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>1.5086</td>
<td>14.8298</td>
<td>.10173 [.921]</td>
</tr>
<tr>
<td>N</td>
<td>.47414</td>
<td>.53957</td>
<td>.87874 [.405]</td>
</tr>
</tbody>
</table>

R-Squared: \( .088026 \)  R-Bar-Squared: \( -.025971 \)
S.E. of Regression: \( 3.6754 \)  F-stat. \( F( 1, 8) = .77218 [.405] \)
Mean of Dependent Variable: \( 14.5000 \)  S.D. of Dependent Variable: \( 3.6286 \)
Residual Sum of Squares: \( 108.0690 \)  Equation Log-likelihood: \( -26.0903 \)
DW-statistic: \( .24350 \)

Diagnostic Tests

* Test Statistics *  IM Version *  F Version *

*  *  *

* A:Serial Correlation*CHSQ( 1) = 8.0888\{.004\}*F( 1, 7) = 29.6256\{.001\}*
*  *  *

* B:Functional Form *CHSQ( 1) = 5.2457\{.022\}*F( 1, 7) = 7.7235\{.027\}*

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A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

Tax on profit / Secondary education vocational

\[ \text{Tax on profit} \]
\[ \text{Fitted} \]

Years

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
Ordinary Least Squares Estimation

Dependent variable is H

10 observations used for estimation from 2001 to 2010

Regressor Coefficient Standard Error T-Ratio[Prob]
CON 10.3070 27.2301 .37852[.715]
O .087719 .56910 .15414[.881]

R-Squared .0029610 R-Bar-Squared -.12167
S.E. of Regression 3.8430 F-stat. F( 1, 8) .023758[.881]
Mean of Dependent Variable 14.5000 S.D. of Dependent Variable 3.6286
Residual Sum of Squares 118.1491 Equation Log-likelihood -26.5362
DW-statistic .13933

Diagnostic Tests

A:Serial Correlation*CHSQ( 1)= 8.0707[.004]*F( 1, 7)= 29.2820[.001]*
B:Functional Form *CHSQ( 1)= .50577[.477]*F( 1, 7)= .37290[.561]*
* C: Normality *CHSQ( 2)= 1.2254[.542]* Not applicable *

* D: Heteroscedasticity *CHSQ( 1)= 5.4250[.020]* F( 1, 8)= 9.4864[.015]*

*******************************************************************************

A: Lagrange multiplier test of residual serial correlation

B: Ramsey's RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

D: Based on the regression of squared residuals on squared fitted values

---

**Tax on profit/Secondary enrollment**

![Graph showing tax on profit and fitted data over years](image)

**School enrollment secondary male/taxes goods services**

![Graph showing school enrollment and fitted data over years](image)
Ordinary Least Squares Estimation

Dependent variable is H

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>1.50E+11</td>
<td>4.07E+10</td>
<td>3.6742[.002]</td>
</tr>
<tr>
<td>C</td>
<td>-2.01E+09</td>
<td>7.63E+08</td>
<td>-2.6386[.016]</td>
</tr>
</tbody>
</table>

R-Squared                     .26817   R-Bar-Squared                   .22965
S.E. of Regression          2.08E+10   F-stat.    F(  1,  19)    6.9623[.016]
Mean of Dependent Variable  4.28E+10   S.D. of Dependent Variable    2.36E+10
Residual Sum of Squares     8.18E+21   Equation Log-likelihood      -527.6199
Akaike Info. Criterion     -529.6199   Schwarz Bayesian Criterion   -530.6644
DW-statistic                1.3217

Diagnostic Tests

Test Statistics *   LM Version *   F Version *

*   *   *

* A:Serial Correlation*CHSQ(  1)=  .76686[.381]*F(  1,  18)=  .68222[.420]  *
**A:** Lagrange multiplier test of residual serial correlation

**B:** Ramsey's RESET test using the square of the fitted values

**C:** Based on a test of skewness and kurtosis of residuals

**D:** Based on the regression of squared residuals on squared fitted values

---

**GDP / merchandise from high income economies**

![Graph showing GDP and fitted values over years](image)
Plot of Residuals and Two Standard Error Bands

Autocorrelation function of residuals, sample from 1990 to 2010
Ordinary Least Squares Estimation

*************************************************************

Dependent variable is H

21 observations used for estimation from 1990 to 2010

*************************************************************

Regressor  Coefficient  Standard Error  T-Ratio[Prob]

CON       -2.07E+10      7.90E+09     -2.6197[.017]
D          3.37E+09      3.66E+08      9.2251[.000]

*************************************************************

R-Squared     .81749  R-Bar-Squared   .80788
S.E. of Regression  1.22E+10  F-stat.  F( 1, 19)  85.1032[.000]
Mean of Dependent Variable  4.79E+10  S.D. of Dependent Variable  2.78E+10
Residual Sum of Squares   2.82E+21  Equation Log-likelihood  -516.4542
Akaike Info. Criterion  -518.4542  Schwarz Bayesian Criterion  -519.4988
DW-statistic       1.9448

*************************************************************

Diagnostic Tests

*************************************************************

* Test Statistics *  LM Version  *  F Version  *

*************************************************************

*  

* A:Serial Correlation*CHSQ( 1)=  .049531[.824]*F( 1, 18)=  .042556[.839]*

*  

* B:Functional Form  *CHSQ( 1)=  .52975[.467]*F( 1, 18)=  .46582[.504]*

*************************************************************
A: Lagrange multiplier test of residual serial correlation
B: Ramsey’s RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
Plot of Residuals and Two Standard Error Bands

Autocorrelation function of residuals, sample from 1990 to 2010

Standardized Spectral Density of Residuals (Parzen Window)
Ordinary Least Squares Estimation

Dependent variable is H
21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-1.87E+10</td>
<td>8.74E+09</td>
<td>-2.1358[.046]</td>
</tr>
<tr>
<td>E</td>
<td>4.10E+09</td>
<td>5.06E+08</td>
<td>8.0958[.000]</td>
</tr>
</tbody>
</table>

R-Squared                     .77526   R-Bar-Squared                   .76343
S.E. of Regression          1.35E+10   F-stat.    F(  1,  19)   65.5425[.000]
Mean of Dependent Variable  4.79E+10   S.D. of Dependent Variable    2.78E+10
Residual Sum of Squares     3.48E+21   Equation Log-likelihood      -518.6396
Akaike Info. Criterion     -520.6396   Schwarz Bayesian Criterion   -521.6841
DW-statistic                  1.7683

Diagnostic Tests

<table>
<thead>
<tr>
<th>* Test Statistics *</th>
<th>LM Version</th>
<th>* F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A:Serial Correlation*CHSQ( 1)= .6556E-5[.998]<em>F( 1, 18)= .5619E-5[.998]</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>B:Functional Form   *CHSQ( 1)= 4.2247[.040]<em>F( 1, 18)= 4.5332[.047]</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
Plot of Residuals and Two Standard Error Bands

Autocorrelation function of residuals, sample from 1990 to 2010

Standardized Spectral Density of Residuals (Parzen Window)
### Ordinary Least Squares Estimation

Dependent variable is $H$

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>6.48E+09</td>
<td>5.08E+09</td>
<td>1.2752[.218]</td>
</tr>
<tr>
<td>F</td>
<td>3.73E+08</td>
<td>3.93E+07</td>
<td>9.4944[.000]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>R-Squared</th>
<th>.82592</th>
<th>R-Bar-Squared</th>
<th>.81675</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.E. of Regression</td>
<td>1.19E+10</td>
<td>F-stat. F(1, 19)</td>
<td>90.1432[.000]</td>
</tr>
<tr>
<td>Mean of Dependent Variable</td>
<td>4.79E+10</td>
<td>S.D. of Dependent Variable</td>
<td>2.78E+10</td>
</tr>
<tr>
<td>Residual Sum of Squares</td>
<td>2.69E+21</td>
<td>Equation Log-likelihood</td>
<td>-515.9578</td>
</tr>
<tr>
<td>Akaike Info. Criterion</td>
<td>-517.9578</td>
<td>Schwarz Bayesian Criterion</td>
<td>-519.0023</td>
</tr>
<tr>
<td>DW-statistic</td>
<td>1.8004</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Diagnostic Tests

**A: Serial Correlation**

$\text{CHSQ}(1) = 0.037173[.847] F(1, 18) = 0.031919[.860]$  

**B: Functional Form**

$\text{CHSQ}(1) = 0.21125[.646] F(1, 18) = 0.18291[.674]$
**A:** Lagrange multiplier test of residual serial correlation

**B:** Ramsey's RESET test using the square of the fitted values

**C:** Based on a test of skewness and kurtosis of residuals

**D:** Based on the regression of squared residuals on squared fitted values

---

### GDP Export Volume Index (2000=100)

- **H:** GDP export volume index
- **Fitted:** Fitted values

<table>
<thead>
<tr>
<th>Years</th>
<th>GDP Export Volume Index (2000=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>5.0e+10</td>
</tr>
<tr>
<td>1992</td>
<td>1.0e+11</td>
</tr>
<tr>
<td>1994</td>
<td>1.5e+11</td>
</tr>
<tr>
<td>1996</td>
<td>0.0e+00</td>
</tr>
<tr>
<td>1998</td>
<td>0.0e+00</td>
</tr>
<tr>
<td>2000</td>
<td>5.0e+10</td>
</tr>
<tr>
<td>2002</td>
<td>1.0e+11</td>
</tr>
<tr>
<td>2004</td>
<td>1.5e+11</td>
</tr>
<tr>
<td>2006</td>
<td>0.0e+00</td>
</tr>
<tr>
<td>2008</td>
<td>0.0e+00</td>
</tr>
<tr>
<td>2010</td>
<td>5.0e+10</td>
</tr>
</tbody>
</table>
Plot of Residuals and Two Standard Error Bands

Autocorrelation function of residuals, sample from 1990 to 2010
Ordinary Least Squares Estimation

Dependent variable is $H$

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-2.17E+11</td>
<td>1.19E+11</td>
<td>-1.8279 [0.083]</td>
</tr>
<tr>
<td>G</td>
<td>3.02E+09</td>
<td>1.35E+09</td>
<td>2.2342 [0.038]</td>
</tr>
</tbody>
</table>

R-Squared                     .20806   R-Bar-Squared                   .16638
S.E. of Regression          2.54E+10   F-stat.     F(  1,  19)    4.9917[.038]
Mean of Dependent Variable  4.79E+10   S.D. of Dependent Variable  2.78E+10
Residual Sum of Squares     1.23E+22   Equation Log-likelihood      -531.8648
Akaike Info. Criterion      -533.8648   Schwarz Bayesian Criterion   -534.9093
DW-statistic                  .50308

Diagnostic Tests

* Test Statistics *       LM Version       * F Version       *

*                         *                          *                            *
* A:Serial Correlation*CHSQ( 1)= 10.6148(.001)*F( 1, 18)= 18.3979(.000)*
* A: Lagrange multiplier test of residual serial correlation
  * B: Ramsey's RESET test using the square of the fitted values
  * C: Based on a test of skewness and kurtosis of residuals
  * D: Based on the regression of squared residuals on squared fitted values

---

**gdp manufactures exports**

- **gdp**
- **Fitted**

---

Years

**gdp**

**Fitted**

---

### Functional Form

\*CHSQ(1) = 0.065792\[0.798\] \*F(1, 18) = 0.056570\[0.815\]\*

### Normality

\*CHSQ(2) = 5.6229\[0.060\] Not applicable

### Heteroscedasticity

\*CHSQ(1) = 0.40490\[0.525\] \*F(1, 19) = 0.37354\[0.548\]
**Ordinary Least Squares Estimation**

Dependent variable is H

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>1.11E+11</td>
<td>7.73E+10</td>
<td>1.4311 [.171]</td>
</tr>
<tr>
<td>C</td>
<td>-1.93E+09</td>
<td>1.14E+09</td>
<td>-1.7022 [.107]</td>
</tr>
<tr>
<td>D</td>
<td>7.63E+09</td>
<td>2.62E+09</td>
<td>2.9141 [.010]</td>
</tr>
<tr>
<td>E</td>
<td>-7.11E+09</td>
<td>3.82E+09</td>
<td>-1.8610 [.080]</td>
</tr>
</tbody>
</table>

R-Squared                     .85174   R-Bar-Squared                   .82558
S.E. of Regression          1.16E+10   F-stat.    F(  3,  17)   32.5543 [.000]
Mean of Dependent Variable  4.79E+10   S.D. of Dependent Variable    2.78E+10
Residual Sum of Squares     2.29E+21   Equation Log-likelihood      -514.2719
Akaike Info. Criterion     -518.2719   Schwarz Bayesian Criterion   -520.3610
DW-statistic                  1.8632

**Diagnostic Tests**

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ(1) = .0012473 [.972]</td>
<td>F(1, 16) = .9504E-3 [.976]</td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
Plot of Residuals and Two Standard Error Bands

Autocorrelation function of residuals, sample from 1990 to 2010
Ordinary Least Squares Estimation

Dependent variable is H
21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>4.68E+10</td>
<td>7.50E+09</td>
<td>6.2398 [.000]</td>
</tr>
<tr>
<td>J</td>
<td>1.74E+07</td>
<td>6.58E+07</td>
<td>.26433 [.794]</td>
</tr>
</tbody>
</table>

| R-Squared | .0036639    | R-Bar-Squared  | -.048775       |
| S.E. of Regression | 2.85E+10    | F-stat. F(1, 19) | .069871 [.794] |
| Mean of Dependent Variable | 4.79E+10    | S.D. of Dependent Variable | 2.78E+10       |
| Residual Sum of Squares      | 1.54E+22    | Equation Log-likelihood | -534.2756      |
| Akaike Info. Criterion       | -536.2756   | Schwarz Bayesian Criterion | -537.3201      |
| DW-statistic                | .33818      |                       |                |

Diagnostic Tests

* Test Statistics * LM Version * F Version *

*                                    *                                   *

* A:Serial Correlation * CHSQ(1)= 13.8622 [.000] * F(1, 18)= 34.9573 [.000] *
*                                    *                                   *

* B:Functional Form * CHSQ(1)= 14.0520 [.000] * F(1, 18)= 36.4041 [.000] *
*                                    *                                   *
* C: Normality
  * CHSQ(2) = 1.3612[.506]* Not applicable *

* D: Heteroscedasticity
  * CHSQ(1) = .62635[.429]* F(1, 19) = .58412[.454]*

******************************************************************************

A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
Autocorrelation function of residuals, sample from 1990 to 2010
Ordinary Least Squares Estimation

Dependent variable is H

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-4.80E+09</td>
<td>1.24E+10</td>
<td>-.38761[.703]</td>
</tr>
<tr>
<td>K</td>
<td>-1.3773</td>
<td>.77980</td>
<td>-1.7662[.096]</td>
</tr>
<tr>
<td>L</td>
<td>-8.0947</td>
<td>8.8263</td>
<td>-.91712[.373]</td>
</tr>
<tr>
<td>M</td>
<td>2.5287</td>
<td>1.4549</td>
<td>1.7380[.101]</td>
</tr>
<tr>
<td>N</td>
<td>3.5925</td>
<td>3.2009</td>
<td>1.1223[.278]</td>
</tr>
</tbody>
</table>

R-Squared                     .91029   R-Bar-Squared                   .88786
S.E. of Regression          9.32E+09   F-stat.    F(  4,  16)   40.5885[.000]
Mean of Dependent Variable  4.79E+10   S.D. of Dependent Variable    2.78E+10
Residual Sum of Squares     1.39E+21   Equation Log-likelihood      -508.9967
Akaike Info. Criterion      -513.9967   Schwarz Bayesian Criterion   -516.6080
DW-statistic                  2.1174

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

239
A: Lagrange multiplier test of residual serial correlation

B: Ramsey’s RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

D: Based on the regression of squared residuals on squared fitted values
Plot of Residuals and Two Standard Error Bands

Autocorrelation function of residuals, sample from 1990 to 2010
GDP –H-CON AGRICULTURE VALUE ADDED-K–; MANUFACTURING VALUE ADDED-L–

Ordinary Least Squares Estimation

*******************************************************************************
Dependent variable is H
21 observations used for estimation from 1990 to 2010
*******************************************************************************
Regressor              Coefficient       Standard Error         T-Ratio[Prob]
CON                      7.77E+09           8.33E+09             .93222[.364]
K                         -1.8536             .79892            -2.3201 [.032]
L                          5.8031             .74182             7.8228[.000]
*******************************************************************************
R-Squared                     .88257   R-Bar-Squared                   .86952
S.E. of Regression          1.00E+10   F-stat.    F(  2,  18)   67.6400[.000]
Mean of Dependent Variable  4.79E+10   S.D. of Dependent Variable    2.78E+10
Residual Sum of Squares     1.82E+21   Equation Log-likelihood      -511.8242
Akaike Info. Criterion     -514.8242   Schwarz Bayesian Criterion   -516.3910
DW-statistic                  1.9088
*******************************************************************************

Diagnostic Tests
*******************************************************************************
*    Test Statistics   *        LM Version        *         F Version          *
*******************************************************************************
*                     *                          *                            *
* A:Serial Correlation  *CHSQ(  1)= .17647[.674]*F{  1,  17}= .14407[.709]*
*                     *                          *                            *
* B:Functional Form    *CHSQ(  1)= 5.1857[.023]*F{  1,  17}= 5.5744[.030]*
A: Lagrange multiplier test of residual serial correlation

B: Ramsey's RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

D: Based on the regression of squared residuals on squared fitted values
**Ordinary Least Squares Estimation**

Dependent variable is H

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-2.35E+10</td>
<td>1.15E+10</td>
<td>-2.0441[.056]</td>
</tr>
<tr>
<td>O</td>
<td>1.5742</td>
<td>12.7940</td>
<td>.12304[.903]</td>
</tr>
<tr>
<td>P</td>
<td>1.6616</td>
<td>1.0431</td>
<td>1.5929[.129]</td>
</tr>
</tbody>
</table>

**R-Squared** .85065  **R-Bar-Squared** .83405

**S.E. of Regression** 1.13E+10  **F-stat.** F( 2, 18) 51.2599[.000]

**Mean of Dependent Variable** 4.79E+10  **S.D. of Dependent Variable** 2.78E+10

**Residual Sum of Squares** 2.31E+21  **Equation Log-likelihood** -514.3490

**Akaike Info. Criterion** -517.3490  **Schwarz Bayesian Criterion** -518.9158

**DW-statistic** 1.9084
Plot of Residuals and Two Standard Error Bands
Ordinary Least Squares Estimation

Dependent variable is $H$

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-2.34E+10</td>
<td>7.27E+09</td>
<td>-3.2217[.004]</td>
</tr>
<tr>
<td>R</td>
<td>1.6551</td>
<td>.15911</td>
<td>10.4026[.000]</td>
</tr>
</tbody>
</table>

R-Squared                     .85065   R-Bar-Squared                   .84279
S.E. of Regression          1.10E+10   F-stat. F( 1, 19) 108.2150[.000]
Mean of Dependent Variable  4.79E+10   S.D. of Dependent Variable 2.78E+10
Residual Sum of Squares     2.31E+21   Equation Log-likelihood -514.3490
Akaike Info. Criterion     -516.3490   Schwarz Bayesian Criterion -517.3935
DW-statistic                  1.9083

Diagnostic Tests

Test Statistics *   LM Version   *   F Version   *

* A:Serial Correlation*CHSQ(1) = .011182[.916]*F(1, 18) = .0095897[.923]*

* B:Functional Form *CHSQ(1) = .55697[.455]*F(1, 18) = .49041[.493]*
**C: Normality**

$\chi^2(2) = 7.8592 \{.020\}$

Not applicable

**D: Heteroscedasticity**

$\chi^2(1) = 1.2839 \{.257\}$

$F(1, 19) = 1.2373 \{.280\}$

******************************************************************************

**A: Lagrange multiplier test of residual serial correlation**

gdp con final consump expenditure

![Plot of residuals and two standard error bands](chart)

Plot of residuals and two standard error bands

![Autocorrelation function of residuals](chart)

Autocorrelation function of residuals, sample from 1990 to 2010
Ordinary Least Squares Estimation

Dependent variable is H
21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-1.92E+10</td>
<td>6.67E+09</td>
<td>-2.8828[.010]</td>
</tr>
<tr>
<td>S</td>
<td>1.2285</td>
<td>.11423</td>
<td>10.7548[.000]</td>
</tr>
</tbody>
</table>

R-Squared                     .85891   R-Bar-Squared                   .85148
S.E. of Regression          1.07E+10   F-stat.    F(  1,  19)  115.6650[.000]
Mean of Dependent Variable  4.79E+10   S.D. of Dependent Variable    2.78E+10
Residual Sum of Squares     2.18E+21   Equation Log-likelihood      -513.7515
Akaike Info. Criterion     -515.7515   Schwarz Bayesian Criterion   -516.7960
DW-statistic                  2.0004

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ(1)= .022030[.882] F(1, 18)= .018903[.892]</td>
<td></td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ(1)= .25539[.613] F(1, 18)= .22160[.643]</td>
<td></td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation
B: Ramsey’s RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values
Ordinary Least Squares Estimation

*******************************************************************************
Dependent variable is H
21 observations used for estimation from 1990 to 2010
*******************************************************************************
Regressors	Coefficient	Standard Error	T-Ratio[Prob]
CON	-2.25E+10	1.12E+10	-2.0054[.060]
T	-5.7382	3.5484	-1.6171[.123]
U	9.9259	3.2579	3.0467[.007]
*******************************************************************************
R-Squared	.88641	R-Bar-Squared	.87378
S.E. of Regression	9.88E+09	F-stat. F( 2, 18) 70.2297[.000]
Mean of Dependent Variable	4.79E+10	S.D. of Dependent Variable	2.78E+10
Residual Sum of Squares	1.76E+21	Equation Log-likelihood	-511.4753
Akaike Info. Criterion	-514.4753	Schwarz Bayesian Criterion	-516.0421
DW-statistic	2.2491
*******************************************************************************
Diagnostic Tests
*******************************************************************************
* Test Statistics *   LM Version   *   F Version   *
*******************************************************************************
*                        *                        *                        *
* A:Serial Correlation*CHSQ( 1)= .63484(.426)*F( 1, 17)= .52994(.477)*
*                        *                        *

* B: Functional Form  *CHSQ(1) = 0.044854*[0.832] F(1, 17) = 0.036388*[0.851]*

* C: Normality  *CHSQ(2) = 1.8617*[0.394] Not applicable *

* D: Heteroscedasticity *CHSQ(1) = 4.0462*[0.044] F(1, 19) = 4.5345*[0.047]*
Ordinary Least Squares Estimation

Dependent variable is H

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio [Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>9.44E+09</td>
<td>4.79E+09</td>
<td>1.9721 [.063]</td>
</tr>
<tr>
<td>T</td>
<td>4.9910</td>
<td>.52218</td>
<td>9.5579 [.000]</td>
</tr>
</tbody>
</table>

R-Squared                     .82783   R-Bar-Squared                   .81876
S.E. of Regression          1.18E+10   F-stat.    F(  1,  19)   91.3533 [.000]
Mean of Dependent Variable  4.79E+10   S.D. of Dependent Variable    2.78E+10
Residual Sum of Squares     2.66E+21   Equation Log-likelihood      -515.8420
Akaike Info. Criterion     -517.8420   Schwarz Bayesian Criterion   -518.8866
DW-statistic                  1.8614

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ( 1) = 0.0036007 [.952] *F( 1, 18) = 0.0030868 [.956]</td>
<td></td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ( 1) = 0.0026473 [.959] *F( 1, 18) = 0.0022694 [.963]</td>
<td></td>
</tr>
</tbody>
</table>
* C: Normality
  $* \text{CHSQ}(2) = 2.4583[.293]*$
  Not applicable $*$

* D: Heteroscedasticity
  $* \text{CHSQ}(1) = .21689[.641]*$
  $F(1, 19) = .19829[.661]$

*******************************************************************************

A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

```
gdp exprt of goods and services

gdp

Fitted

```
Ordinary Least Squares Estimation

Dependent variable is \( H \)

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>-6.34E+09</td>
<td>5.31E+09</td>
<td>-1.1930[.248]</td>
</tr>
<tr>
<td>U</td>
<td>4.6974</td>
<td>.41675</td>
<td>11.2714[.000]</td>
</tr>
</tbody>
</table>

R-Squared                     .86990   R-Bar-Squared                   .86306
S.E. of Regression          1.03E+10   F-stat.    F(  1,  19)  127.0447[.000]
Mean of Dependent Variable  4.79E+10   S.D. of Dependent Variable    2.78E+10
Residual Sum of Squares     2.01E+21   Equation Log-likelihood      -512.8997
Akaike Info. Criterion     -514.8997   Schwarz Bayesian Criterion   -515.9442
DW-statistic                  2.1332

Diagnostic Tests

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ( 1)= .38810[.533]</td>
<td>F( 1, 18)= .33892[.568]</td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ( 1)= .11522[.734]</td>
<td>F( 1, 18)= .099304[.756]</td>
</tr>
</tbody>
</table>
A: Lagrange multiplier test of residual serial correlation

B: Ramsey's RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

D: Based on the regression of squared residuals on squared fitted values

Plot of Residuals and Two Standard Error Bands
**Ordinary Least Squares Estimation**

Dependent variable is $H$

21 observations used for estimation from 1990 to 2010

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>1.41E+10</td>
<td>4.94E+09</td>
<td>2.8648[.010]</td>
</tr>
<tr>
<td>W</td>
<td>-10.8103</td>
<td>1.2855</td>
<td>-8.4093[.000]</td>
</tr>
</tbody>
</table>

R-Squared                      .78822   R-Bar-Squared                   .77708
S.E. of Regression            1.31E+10   F-stat.    F(  1,  19)   70.7169[.000]
Mean of Dependent Variable    4.79E+10   S.D. of Dependent Variable 2.78E+10
Residual Sum of Squares       3.28E+21   Equation Log-likelihood      -518.0158
Akaike Info. Criterion        -520.0158   Schwarz Bayesian Criterion   -521.0603
DW-statistic                  1.5149

**Diagnostic Tests**

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>LM Version</th>
<th>F Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:Serial Correlation</td>
<td>CHSQ( 1)= .96657[.326]<em>F{ 1, 18}= .86846[.364]</em></td>
<td></td>
</tr>
<tr>
<td>B:Functional Form</td>
<td>CHSQ( 1)= .01357[.907]<em>F{ 1, 18}= .011639[.915]</em></td>
<td></td>
</tr>
<tr>
<td>C:Normality</td>
<td>CHSQ( 2)= 14.4816[.001]* Not applicable</td>
<td></td>
</tr>
</tbody>
</table>

256
A: Lagrange multiplier test of residual serial correlation

B: Ramsey’s RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

D: Based on the regression of squared residuals on squared fitted values