

CHAPTER 2

Table 2.1: Worldwide size of “second economy”(1999-2000)

Table 2. The Relative Size of the Shadow Economy, 1999/2000			
<i>Country</i>	Shadow Economy as Percent of GNP 1999/2000	<i>Country</i>	Shadow Economy as Percent of GNP 1999/2000
Albania	33.4	Guatemala	51.5
Algeria	34.1	Honduras	49.6
Argentina	25.4	Hong Kong, China	16.6
Armenia	46.3	Hungary	25.1
Australia	14.3	India	23.1
Austria	10.2	Indonesia	19.4
Azerbaijan	60.6	Iran	18.9
Bangladesh	35.6	Ireland	15.8
Belarus	48.1	Israel	21.9
Belgium	23.2	Italy	27
Benin	45.2	Jamaica	36.4
Bolivia	67.1	Japan	11.3
Bosnia-Herzegovina	34.1	Jordan	19.4
Botswana	33.4	Kazakhstan	43.2
Brazil	39.8	Kenya	34.3
Bulgaria	36.9	Republic of Korea	27.5
Burkina Faso	38.4	Kyrgyz Republic	39.8
Cameroon	32.8	Latvia	39.9
Canada	16	Lebanon	34.1
Chile	19.8	Lithuania	30.3
China	13.1	Madagascar	39.6
Colombia	39.1	Malawi	40.3
Costa Rica	26.2	Malaysia	31.1
Cote d'Ivoire	39.9	Mali	41
Croatia	33.4	Mexico	30.1
Czech Republic	19.1	Moldova	45.1
Denmark	18.2	Mongolia	18.4
Dominican Republic	32.1	Morocco	36.4
Ecuador	34.4	Mozambique	40.3
Egypt	35.1	Nepal	38.4
Ethiopia	40.3	Netherlands	13
Finland	18.3	New Zealand	12.8
France	15.3	Nicaragua	45.2
Georgia	67.3	Niger	41.9
Germany	16.3	Nigeria	57.9
Ghana	38.4	Norway	19.1
Greece	28.6	Pakistan	36.8

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Panama	64.1	Taiwan, China	19.6
Peru	59.9	Tanzania	58.3
Philippines	43.4	Thailand	52.6
Poland	27.6	Tunisia	38.4
Portugal	22.6	Turkey	32.1
Romania	34.4	Uganda	43.1
Russian Federation	46.1	Ukraine	52.2
Saudi Arabia	18.4	United Arab Emirates	26.4
Senegal	43.2	United Kingdom	12.6
Singapore	13.1	United States	8.7
Slovak Republic	18.9	Uruguay	51.1
Slovenia	27.1	Uzbekistan	34.1
South Africa	28.4	Venezuela	33.6
Spain	22.6	Vietnam	15.6
Sri Lanka	44.6	Yemen	27.4
Sweden	19.1	Yugoslavia	29.1
Switzerland	8.8	Zambia	48.9
Syria	19.3	Zimbabwe	59.4

Sources: Schneider (2002) and Schneider and Enste (2000, 2002). The physical input (electricity) method, the currency method, and the model (DYMIMIC) approach are used for the developing countries in Africa, Asia, and South America; the information is taken from Tables 2, 3, and 4 of Schneider (2002). The size of the shadow economy in transition countries is estimated using similar methods, and the information is taken from Table 5 of Schneider (2002). For all OECD countries except New Zealand, the size of the shadow economy is calculated using the currency demand method and taken from Table 8 of Schneider (2002); for New Zealand, the shadow economy is estimated using both the MIMIC-method and the currency demand approach.

CHAPTER 4 –Proxy indicators of UE**Table 4.1: Information on indicator and determinant variables**

<p>CPI</p> <p>Consumer Price Index Malaysia (CPI) is the average rate of change in prices of a fixed basket of goods and services which represent the expenditure pattern of all household in Malaysia with reference to the base period.</p> <p>The CPI series follow the recommended classification contained in the United Nations System of National Accounts (SNA), 1968 viz. Classification of Household Goods and Services. The CPI basket includes those goods and services which are important in terms of the size of the expenditures made by Malaysian households. The total basket is divided into the following 9 groups: food, beverages and tobacco; clothing and footwear; gross rent, fuel and power; furniture, furnishings and household equipment and operation; medical care and health expenses; transport and communication; recreation, entertainment, education and cultural services and miscellaneous goods and services.</p> <p>It is calculated based on a slight variation of the Laspeyres formula with constant weight. In this formula the constant weight is a weighted aggregative index using expenditures rather than quantities as weights. Thus the constant weight is known as weighted average of price relatives i.e. ratios of prices are weighted by total expenditure.</p> <p>CPI used in this study is based on the relative CPI of the 1980 series, instead of the reviewed series (1990, 1994, 2000 and 2005). The latter series were reviewed from time to time to ensure that it continues to be relevant to current conditions, because over time, household spending habits change and the range of available goods and services changes. The employment of the 1980 series should reflect the price changes in the later years as compared to the year 1980, without considering the spending habits change.</p>
<p>Unemployment</p> <p>The labor force statistics is derived from the labor force survey primarily to collect on information on the structure and distribution of the labor force, employment and unemployment.</p> <p>The labor force includes all persons in the age-group 15-64 years old who were either employed or unemployed. It excludes persons in the same age-group reported as not at work, without jobs and not wanting to work. The labor force participation rate is the percent of the working age population (15-64 years) who are in the labor force.</p> <p>Employed includes all persons who works for pay or profit or family gains at any time during the reference period. This includes those work temporarily, on part time basis and who do not work temporarily but with a job. The unemployed includes those who are actively and inactively unemployed persons.</p>

GDP

The system of national accounts is based on the concepts and methodology outlined in the publication entitled “System of National Accounts, 1968”, in short referred to as the SNA (1993) of the United Nations Statistical Office. The estimates are based on supply and demand indicators emanating from current statistics collected by the Department and secondary data collected by agencies outside the Department.

GDP is defined as the total of value of goods and services produced within a given period after deducting the cost of goods and services used up in the process of production but before deducting allowances for the consumption of fixed capital. The GDP is computed by type of expenditure which is be valued at purchasers’ values and at factor cost.

GDP is computed both in current and constant prices. For the latter GDP has been rebased in the year 1971, 1973, 1978, 1987, 1991 and 2000, to take into account for structural changes over time in production structure, structural changes in relative prices, structural changes in consumption patterns, appearance of new products and large quality changes that can effectively be incorporated in the national accounts estimates.

Note:

The gross domestic product (GDP) or gross domestic income (GDI) is one of the measures of national income and output for a given country's economy. GDP can be defined in three ways, all of which are conceptually identical. First, it is equal to the total expenditures for all final goods and services produced within the country in a stipulated period of time (usually a 365-day year). Second, it is equal to the sum of the value added at every stage of production (the intermediate stages) by all the industries within a country, plus taxes less subsidies on products, in the period. Third, it is equal to the sum of the income generated by production in the country in the period—that is, compensation of employees, taxes on production and imports less subsidies, and gross operating surplus (or profits).

Table 4.1: ...continue**Transparency International Corruption Perceptions index**

Since 1995, Transparency International has published an annual Corruption Perceptions Index (CPI) ordering the countries of the world according to “the degree to which corruption is perceived to exist among public officials and politicians”.

The index defines corruption as the abuse of public office for private gain and measures the degree to which corruption is perceived to exist among a country’s public officials, academics and politicians. It is a composite index, drawing on 14 polls and surveys from 12 independent institutions, which gathered the opinions of business people and country analysts.

The index score range from 0 to 10. A score of 10 indicate the least perceived of corruption. A score of less than 5 out of 10 indicate more perceived to corruption.

Although it is an international index, much criticism has been said about the reliability measure. As this index is based on polls taken annually, the results are subjective, such that the annual changes in a country’s score could either result from a changing perception of a country’s performance or from a changing sample (differing respondents thus different viewpoints) and methodology (variety of questions through third party surveys because of its hidden in nature). The perception of corruption may be also different across countries.

The lack of standardization and precision in these surveys has drawn increasing criticism, thus less reliable for countries with fewer sources.

Gini coefficient

Estimate income inequality in a society, range between 0-1, the higher degree of income in equality in a society becomes Source: [CIA World Factbook](#)

Human Development Report

Has published the [Human Development Index \(HDI\)](#) which was introduced as an alternative to conventional measures of national development, such as level of income and the rate of economic growth. The HDI represents a broader definition of well-being and provides a composite measure of three basic dimensions of human development: health, education and income. The HDI trend tells an important story both at the national and regional level. It highlights the very large gaps in well-being and life chances that continue to divide our interconnected world.

http://www.indexmundi.com/malaysia/distribution_of_family_income_gini_index.html

Source: [Department of Statistics, Malaysia](#)

Table 4.2: Non compliance of filing of tax form; category of tax group

	Individuals		
	Salary	Business	Company
File registered			
2001	2,218,446	1,075,403	317,066
2004	2,470,980	1,137,720	398,138
2005			
2006			
2009			
Return form issued			
2001	1,724,141	803,383	204,717
2004	1,959,183	1,061,730	272,167
2005	2,198,914	1,314,006	274,207
2006	2,105,802	1,380,648	282,526
2009			
Return form received			
2001	1,101,730	591,788	124,828
2004	1,102,097	778,181	189,789
2005	1,683,201	1,051,672	163,508
2006	1,621,233	974,592	154,612
2009			

Table 4.3: Non compliance of filing of tax form; 2006 compared with 2001

	Individuals					
	Salary	Business	Company			
File registered						
2001						
2004	11.38%	5.79%	25.57%			
2005						
2006						
2009						
Return form issued						
2001						
2004	13.63%	32.16%	32.95%			
2005	12.24%	23.76%	0.75%			
2006	-4.23%	5.07%	3.03%	22.14%	71.85%	38.01%
2009						
Return form received						
2001						
2004	0.03%	31.50%	52.04%			
2005	52.73%	35.14%	-13.85%			
2006	-3.68%	-7.33%	-5.44%	47.15%	64.69%	23.86%
2009						

Source: Inland Revenue Board of Malaysia

Appendix

Table 4.4: *Average percentage of employed labor force between the age group of 35 and 64 (45.48)

%	15-24	25-34	35-54	55-64	total	35-64*
1995	23.8	31.5	38.7	6	100	44.7
1996	24.6	31.2	38.3	5.9	100	44.2
1997	23.9	31.3	38.9	5.9	100	44.8
1998	20.8	31.6	41.2	6.4	100	47.6
1999	22.2	31.7	40.2	5.9	100	46.1

Source: Department of Statistics, Malaysia

Table 4.5: Indirect tax rates ranging from 10% - 300%

Goods smuggled by average tax rate: tax evaded/value of commodities captured	1980	1990	1995	2000	2004	2009
Cigarettes				338.62%	459.45%	358.21%
Liquor				167.69%	210.12%	258.91%
Textile				26.51%	19.67%	19.12%
Vehicles				155.45%	129.90%	151.66%
Multimedia Disc - LD, VCD, DVD, CD - pcs)				31.10%	27.39%	11.03%
Electrical and telecom				17.73%	13.39%	11.44%
Rice				0.00%	0.00%	4.32%
Fire crackers				57.71%	62.54%	65.93%
Other commodities				5.54%	17.46%	5.60%
Average tax rate				88.93%	104.44%	98.74%

Source: Custom Office - average tax rate is at 97.28% (Commodity value divide tax)

CHAPTER 5 – Characteristics of UE

Table 5.1: Household income distribution

Categories of annual household income bracket are as follows:
< RM12,000
RM12,000 to RM24,000
RM24,000 to RM36,000
RM36,000 to RM60,000
RM60,000 to RM120,000
>RM120,000
Note: Income distribution of about 5.8 million households in 2007, indicate that its top 15.8% households are earning an annual income between RM60,000 and RM120,000. Out of this only the top 4.9% are earning an annual income above RM120,000. The remaining bottom household of 15%, 26.6%, 29% and 8.7% are earning between RM36,000 to 60,000; between RM24,000 to RM36,000; between RM12,000 – 24,000 and an annual income below RM12,000, respectively (A report from the Eighth Malaysia Plan and related articles).

Table 5.2: Gini coefficient

Years	Gini coefficient
1957/58	0.41
1967/68	0.44
1973/74	0.5
1976/77	0.57
1984	0.4863
1992	0.4765
1997	0.491
2006	0.492
Note: Income distribution for Malaysia by the Gini** coefficients in the early period were 0.41, 0.44, 0.5 and 0.57 for the years 1957/58, 1967/68, 1973/74 and 1976/77 respectively, (Jomo, 1981). The Gini coefficients in the later years, were 0.4863, 0.4765, 0.491 and 0.492 for 1984, 1992, 1997 and 2006 respectively, (The World Development Indicators Database)	

Descriptive tests for unreported income distribution

Table 5.3: Number of institutional tax evaders – over 2003-2008 period

The top 5 major institutional tax evaders in 2005 were the finance services (25.99%), wholesale and retail (20.14%), real estate services (13.94%), manufacturing (9.87%) and construction (6.91%).

While in 2008 were the wholesale and retail (22.37%), finance services (18.59%), manufacturing (16.41%), real estate services (13.59%), and construction (8.86%).

In terms of the institutional tax evaders, number of contributors, for companies over the period of 2003-2008, the top 5 major industries were consistent over the period of review, implying that these are the prominent industries among the company tax evaders. However, there were some changes in the industry mix over the years.

Table 5.4: Top five evaders by economic industries

Economic industry (number)	2003	2004	2005	2006	2007	2008
Manufacturing	6.89%	10.10%	9.87%	9.94%	12.38%	16.41%
Construction	3.15%	6.05%	6.91%	6.46%	7.09%	8.86%
Trading: Wholesale and Retail	10.95%	16.49%	20.14%	21.71%	20.72%	22.37%
Business services: Finance and related	22.16%	26.05%	25.99%	27.81%	26.22%	18.59%
Business services: Real Estates	7.72%	13.05%	13.94%	14.77%	15.09%	13.59%

Table 5.5: Amount of institutional unreported income – (2003-2008 period)

The top 5 major institutional tax evaders in 2005, were the finance services (9.56%), wholesale and retail (8.46%), construction (7.71%), manufacturing (4.49%) and real estate services (4.37%).

While in 2008 were the finance services (49.75%), manufacturing (17.06%), wholesale and retail (13.31%), real estate services (9.79%), and construction (1.79%).

Similarly, despite of some changes in industry mix over the years, the top 5 major industries were consistent over the period of review, implying that these are the prominent industries for underground income.

Appendix

Table 5.6: Top five economic industries of institutional unreported income

Economic sector (amount by companies)	2003	2004	2005	2006	2007	2008
Manufacturing	7.22%	4.54%	4.49%	39.00%	20.53%	17.06%
Construction	30.74%	19.92%	7.71%	14.31%	5.16%	1.79%
Trading: Wholesale and Retail	3.09%	13.52%	8.46%	5.22%	7.63%	13.31%
Biz services: Finance and related	0.92%	12.05%	9.56%	10.06%	17.50%	49.75%
Biz services: Real Estate	2.37%	6.49%	4.37%	13.83%	5.03%	9.79%

Table 5.7: Individual tax evaders – micro analyses – (on micro data of 2005 audit comprising 2,715 cases and 2008 comprising 2,701 cases)

A	B	C	D	E	F	G	H	I	J
	Industry	% of cases	% of amount	Mean to median ratio (amount of unreported income)	Number of cases to amount of unreported income ratio	Sectors	% of cases	% of amount	Mean to median ratio (amount of unreported income)
2005 data									
1	Wholesale /retail	58.97	58.59	2 - 5	1.0064	Timber Vehicles Kiosk Liquor/ cigarette Others Total	4.31 26.48 6.96 5.78 <u>56.47</u> <u>100.00</u>	34.38 19.13 10.71 5.73 <u>30.05</u> <u>100.00</u>	10 – 20 2 – 5 < 2 2 – 5 2 – 5
2	Services	10.01	8.67	2 - 5	1.1546	Salary/director Vehicles (workshop) Professional Education Comission /direct selling Others Total	1.00 5.91 53.63 1.54 30.58 <u>7.35</u> <u>100.00</u>	2.03 6.24 72.02 4.74 10.3 <u>4.77</u> <u>100.00</u>	10 – 20 2 – 5 2 – 5 2 – 5 2 – 5 2 – 5
3	Construction	25.86	24.64	2 - 5	1.0495	Sales Services Total	32.53 67.47 <u>100.00</u>	21.46 78.54 <u>100.00</u>	< 2 2 – 5
4	Accomodation / restaurant	1.80	4.99	2 - 5	0.3607	Rental Food Total	16.87 83.13 <u>100.00</u>	22.96 77.04 <u>100.00</u>	2 – 5 2 – 5

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Table 5.7: Individual taxpayers on micro data of 2005 audit comprising 2,715 cases and 2008 comprising 2,701 cases

A	B	C	D	E	F	G	H	I	J
	Industry	% of cases	% of amount	Mean to median ratio (amount of unreported income)	Number of cases to amount of unreported income ratio	Sectors	% of cases	% of amount	Mean to median ratio (amount of unreported income)
5	Manufacturing	1.89	1.65	< 2	1.1455				
6	Agriculture/Loggings/fish	1.47	1.46	< 2	1.0068				10 -20 < 2
	Total								
2008 data									
1	Wholesale/retail	50.17	33.53	2 - 5	1.4963	Timber Vehicles Kiosk Liquor/ cigarette Others Total	5.32 17.16 10.65 0.39 <u>66.48</u> <u>100.00</u>	4.81 22.31 8.66 2.37 <u>61.85</u> <u>100.00</u>	2 - 5 5 - 10 < 2 < 2 2 - 5
2	Services	31.47	47.62	10 - 20	0.9888	Salary/director Vehicles (workshop) Professional Education Comission/dire ct selling Others Total	8.43 6.86 57.42 0.5 9.62 <u>27.17</u> <u>100.00</u>	12.1 7.96 43.00 0.27 2.75 <u>33.92</u> <u>100.00</u>	< 20 10 -20 2 - 5 < 2 2 - 5 2 - 5
3	Construction	10.66	10.84	2 - 5	0.9834	Sales Services Total	43.83 <u>69.53</u> <u>100.00</u>	32.48 <u>75.48</u> <u>100.00</u>	2 - 5 2 - 5
4	Accomodation /restaurant	4.18	3.24	2 - 5	1.2901	Rental Food Total	16.65 <u>83.35</u> <u>100.00</u>	6.56 <u>93.45</u> <u>100.00</u>	10 - 20 2 - 5
5	Manufacturing	1.15	1.04	2 - 5	1.1057				
6	Agriculture fish	2.96	4.15	> 20	0.7133				
	Total								

Table 5.8: Number of individual tax evaders – (2005 and 2008)

The top 5 major individual tax evaders in 2005 were from wholesale and retailers (58.97%), followed by construction (25.86%), business services (10.01%), manufacturing (1.89%) and accommodation/restaurants (1.80%).

While in 2008, % of individuals who evade, were from wholesale and retailers (50.17%), followed by business services (31.47%), construction (10.66%), accommodation/restaurants (4.18%) and agriculture/forestry/livestock/fish (2.96%).

Table 5.9: Amount of individual unreported income – (2005 and 2008)

The top 5 individual unreported income in 2005 were from wholesale and retailers (58.59%), followed by construction (24.64%), business services (8.67%), accommodation/restaurants (4.99%) and manufacturing (1.65%).

While in 2008, the % amount of unreported income were from wholesale and retailers (33.53%), followed by business services (47.62%), construction (10.84%), agriculture/forestry/livestock/fish (4.15%) and accommodation/restaurants (3.24%).

There were some changes in industry mix as well as the top 5 major industries over the period of review. Although the prominent industries for underground income change, the shift is not conclusive as it could be due to audit selection programme which are not examined here.

With regards to column E, the income distribution by the mean to median ratio implies that it is of left skew, most of the time by industries is fairly moderate but can be extremely skewed in services and agriculture/fishing industries

With regards to column F, the proportionate percentage between number of tax evaders and amount of unreported income for certain industries (most), implies that as we increase the number of cases to be audited it is likely to capture more unreported income.

However, for the disproportionate percentage between number of tax evaders and amount of unreported income for certain industries (accommodation/restaurant, wholesale/retail), implies that for certain industries or business sectors at times, it is not appropriate and sufficient to use the number of cases as the index for tax evasion.

Table 5.10: Number of individual evaders across industries into 21 business sectors by cross tabulating between economic industries and business sectors.

Based on the 2,714 audited cases in the year 2005, the percentage proportion of prominent sectors is noted as follows:

- i. The wholesale and retail trade industry comprise of 26.48% dealing with vehicles and 6.96% petrol kiosk.
- ii. The construction industry comprise of 32.53% retailers and 67.47% service (professionals; engineers, developers, surveyors)
- iii. The services industry comprises of 53.63% professionals and 30.58% commission/direct selling earners.
- iv. The accommodation and restaurant comprise of 16.87% rental and 83.13% food dealers.

While, based on the 2,701 audited cases in the year 2005, the percentage proportion of prominent sectors are noted as follows:

- i. The wholesale and retail trade industry comprise of 17.16% dealing with vehicles and 10.65% petrol kiosk.
- ii. The construction industry comprise of 43.83% retailers and 69.53% service (professionals; engineers, developers, surveyors)
- iii. The services industry comprises of 57.42% professionals and 9.62% commission/direct selling earners.
- iv. The accommodation and restaurant comprise of 16.65% rental and 83.35% food dealers.

Table 5.11: Amount of individual unreported income across industries into 21 business sectors by cross tabulating between economic industries and business sectors.

Based on the 2,714 audited in the year 2005, the percentage proportion of unreported income are as follows:

- i. The wholesale and retail trade industry comprise of 34.38% dealing with timber, 19.13% vehicles and 10.71% petrol kiosk.
- ii. The construction industry comprise of 21.46% retailers and 78.54% service (professionals; engineers, developers, surveyors).
- iii. The services industry comprises of 72.02% professionals, 10.30% commission/direct selling earners and 2.03% director salary/fees.
- iv. The accommodation and restaurant comprise of 22.96% rental and 77.04% food dealers.

Based on the 2,701 cases audited in the yr 2005, the percentage proportion of unreported income are as follows:

- i. The wholesale and retail trade industry comprise of 4.81% dealing with timber, 22.31% vehicles and 8.66% petrol kiosk.
- ii. The construction industry comprises of 32.48% retailers and 75.48% service (professionals; engineers, developers, surveyors)
- iii. The services industry comprise of 43.10% professionals and 2.75% commission/direct selling earners and 12.10% director salary/fees..
- iv. The accommodation and restaurant comprise of 6.56% rental and 93.45% food dealers.

Table 5.12: UE age association compared with labor force structure

The percentage proportion of the employed labor force within the age group between 35 and 65 is 45.48%, as in Table 4.1 as in this Appendix.
The percentage proportion of individual UE participants between age group of 40 and 59 is 76.38%. Comparing these percentage proportions, $(76.38/45.48 = 1.679)$ roughly the individual UE is about 70% likely to be in the “senior age group”

CHAPTER 6 – Size and trend of UE

Table 6.2: Computation of tax rates (Notes to paragraph of 6.2 as to how tax rates are derived.

Effective tax rate

The effective tax rate of 10% is arrived by dividing the total income with the tax payable of the entire tax base:

Total taxable income

The average enforcement tax rate of 22% is arrived by dividing the number of finalized cases with the total of enforcement cases of the direct tax enforcement record.

Marginal tax rate

The tax rate at 27% is the marginal progressive tax rate derived from the Malaysia tax system for individual (2010) and company (2007).

CHAPTER 7 – Variable associations

7.1 Descriptive statistical tests

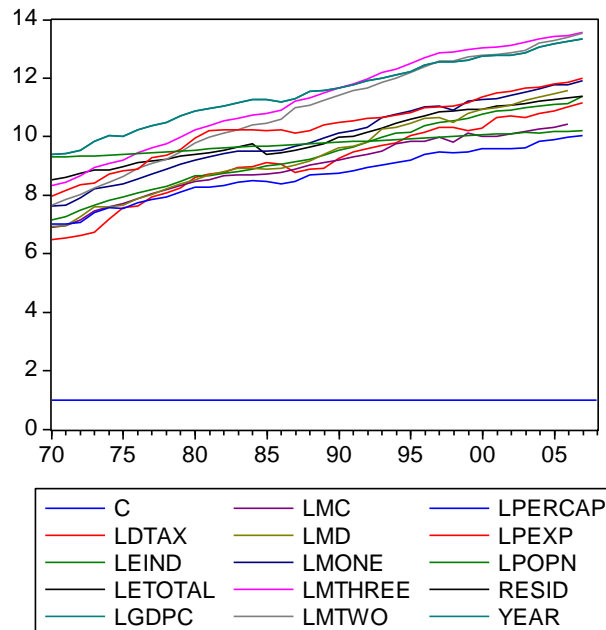


Figure 7.1: Eview output of proxy variables at level

Note:

Variables employed are all trending upward in level form. Literature states that multi collinearity is often encountered in time series data because economic variables tend to move with business cycle.

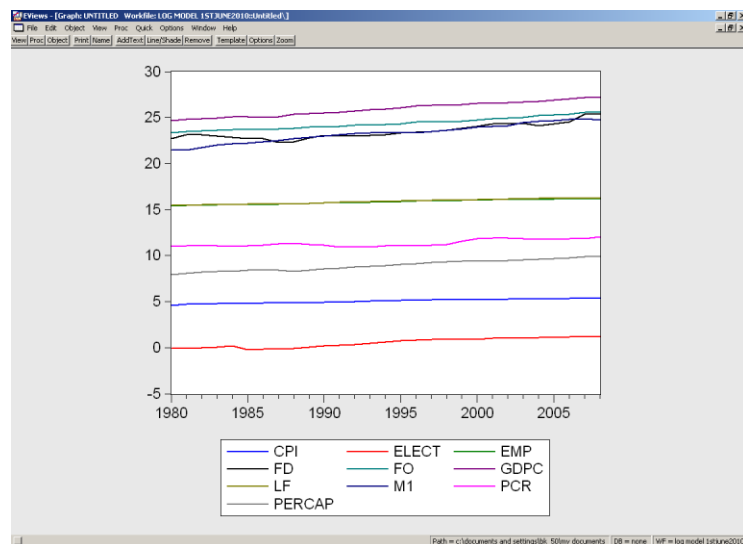


Figure 7.2 : Eview output of proxy variables in log form

Note:

When data variables were transformed into log form, they all approximate to a constant level, suggesting for close to stationary series, an important character for appropriate modeling.

Table 7.1: Normality tests of the proxy variables (1980-2009)

	Log GDPc	Log bribery index	Log M1	Log UE Low series	Log UE moderate series	Log UE upper series
Mean	26.4863	1.63708	23.9907	24.2842	24.5725	24.6494
Median	26.5353	1.6292	23.9386	24.4241	24.5753	24.5826
Maximum	27.2449	1.67150	25.01980	24.7474	25.0814	25.34629
Minimum	25.5874	1.56860	23.1225	23.5961	23.7688	23.8023
Std. Dev.	0.50818	0.03150	0.65246	0.3612	0.4189	0.4630
Skewness	-0.14341	-0.51068	0.20571	-0.4351	-0.4970	-0.3532
Kurtosis	2.03540	2.18602	1.50217	1.8947	1.9918	2.0007
Jarque-Bera	0.801734	1.35036	1.9101	1.5666	1.5868	1.1855
Probability	0.66974	0.50906	0.38479	0.4569	0.4523	0.5528
Sum	503.2397	31.1045	455.8238	461.3998	466.8753	468.3381
Sum Sq. Dev.	4.64842	0.01785	7.6627	2.3488	3.1583	3.8581
Observations	30	30	30	30	30	30

....Continue

Table 7.1: Normality tests of the proxy variables (1980-2009)

	Log electricity	Log CPI	Log GDP percapita	Log employment	Log EPF contribution	Log crime index	Log indirect tax	Log direct tax
Mean	10.4233	5.0663	9.196177	15.8441	22.8502	11.58721	23.3756	23.7081
Median	10.5356	5.1025	9.206300	15.87050	22.9779	11.3908	23.5140	23.7261
Maximum	11.4511	5.4106	10.12020	16.2040	24.3868	12.2627	24.1969	25.2303
Minimum	9.3993	4.6052	8.303600	15.3877	20.7894	11.0889	22.5160	22.4235
Std. Dev.	0.7306	0.2315	0.592059	0.2683	1.0628	0.4212	0.5426	0.8988
Skewness	-0.0863	-0.2256	0.019147	-0.1863	-0.2024	0.3413	-0.2290	0.1456
Kurtosis	1.4473	1.8284	1.654606	1.64594	1.6666	1.4796	1.6059	1.6912
Jarque-Bera	3.0509	1.9701	2.264439	2.4659	2.4271	3.4722	2.6915	2.2474
Probability	0.2175	0.3735	0.322317	0.2915	0.2971	0.1762	0.2603	0.3251
Sum	312.6947	151.9889	275.8853	475.3205	685.5047	347.6162	701.2691	711.2414
Sum Sq. Dev.	15.4783	1.5539	10.16548	2.0868	32.7565	5.1451	8.5386	23.4280
Observations	30	30	30	30	30	30	30	30

....Continue

Table 7.1: Normality tests of the proxy variables (1980-2009)

	Log population	Log federal expenditure	Log federal revenue	Log EPF contribution	Log labor force	Log unemployed
Mean	16.7714	24.7478	24.5405	22.8502	15.8870	12.5495
Median	16.7757	24.6035	24.6392	22.9779	15.9003	12.6350
Maximum	17.1291	26.0507	25.8950	24.3868	16.2617	13.6244
Minimum	16.3957	23.7716	23.3570	20.7894	15.4465	10.3546
Std. Dev.	0.22414	0.6956	0.7570	1.0628	0.2667	0.7369
Skewness	-0.0703	0.40584	0.06962	-0.2024	-0.1105	-1.3916
Kurtosis	1.7761	1.8489	1.7880	1.6666	1.6313	5.3734
Jarque-Bera	1.8971	2.4794	1.8606	2.4271	2.4028	16.7244
Probability	0.3873	0.2895	0.3944	0.2971	0.3008	0.0002
Sum	503.1407	742.4330	736.2157	685.5047	476.6098	376.4860
Sum Sq. Dev.	1.4570	14.0306	16.6194	32.7565	2.0630	15.7495
Observations	30	30	30	30	30	30

The proxy variables are as follows:

GDPc (GDP at constant level); bribery index (perception bribery index); M1 (monetary aggregates); UE (estimated in three level series by the enforcement success rates); electricity consumption in KWhr; CPI (consumer price index); GDP per capita; number of employed labor force; EPF - amount of employees provident fund; crime index - total crime rate; indirect tax non compliance; direct tax non compliance; national population; federal expenditure; federal revenue; number of employed labor force; and number of unemployed labor force.

Table 7.2: Correlation tests among proxy indicators

Correlation												
	CPI	ELECT	EMP	FD	FO	GDPC	LF	M1	PCR	PERCAP	POP	RESID0
CPI	1.000000	0.963767	0.992771	0.855538	0.971868	0.991508	0.989722	0.975331	0.771752	0.991648	0.990273	0.005
ELECT	0.963767	1.000000	0.965946	0.888394	0.948270	0.972147	0.965101	0.922163	0.760739	0.967206	0.954067	0.000
EMP	0.992771	0.965946	1.000000	0.855839	0.976504	0.994196	0.996818	0.982188	0.794609	0.987386	0.995494	0.036
FD	0.855538	0.888394	0.855839	1.000000	0.918413	0.887737	0.864738	0.836027	0.850042	0.897004	0.866594	0.023
FO	0.971868	0.948270	0.976504	0.918413	1.000000	0.986271	0.981000	0.977688	0.848013	0.983276	0.985335	0.018
GDPC	0.991508	0.972147	0.994196	0.887737	0.986271	1.000000	0.991241	0.977441	0.806905	0.990942	0.993617	0.005
LF	0.989722	0.965101	0.996818	0.864738	0.981000	0.991241	1.000000	0.983480	0.804745	0.989407	0.994808	0.028
M1	0.975331	0.922163	0.982188	0.836027	0.977688	0.977441	0.983480	1.000000	0.802322	0.968290	0.990567	-0.006
PCR	0.771752	0.760739	0.794609	0.850042	0.848013	0.806905	0.804745	0.802322	1.000000	0.815494	0.818720	0.002
PERCAP	0.991648	0.967206	0.987386	0.897004	0.983276	0.990942	0.989407	0.968290	0.815494	1.000000	0.988084	-0.006
POP	0.990273	0.954067	0.995494	0.866594	0.985335	0.993617	0.994808	0.990567	0.818720	0.988084	1.000000	0.045
RESID01	0.005002	0.000580	0.036078	0.023506	0.018386	0.005786	0.028874	-0.006511	0.002198	-0.006175	0.045698	1.000
TA	0.989982	0.966649	0.994605	0.890182	0.990060	0.996183	0.995309	0.984956	0.837306	0.992945	0.996903	0.003
TCR	0.793304	0.776364	0.814766	0.856058	0.864807	0.826193	0.823629	0.823956	0.999025	0.833472	0.838924	0.007
TE	0.952011	0.943878	0.950416	0.777768	0.895568	0.941470	0.942885	0.916551	0.641813	0.932285	0.937340	0.046

...continue

Table 7.2: Correlation tests among the proxy indicators

Correlation												
	FD	FO	GDPC	LF	M1	PCR	PERCAP	POP	RESID01	TA	TCR	TE
CPI	0.855538	0.971868	0.991508	0.989722	0.975331	0.771752	0.991648	0.990273	0.005002	0.989982	0.793304	0.952011
ELECT	0.888394	0.948270	0.972147	0.965101	0.922163	0.760739	0.967206	0.954067	0.000580	0.966649	0.776364	0.943878
EMP	0.855839	0.976504	0.994196	0.996818	0.982188	0.794609	0.987386	0.995494	0.036078	0.994605	0.814766	0.950416
FD	1.000000	0.918413	0.887737	0.864738	0.836027	0.850042	0.897004	0.866594	0.023506	0.890182	0.856058	0.777768
FO	0.918413	1.000000	0.986271	0.981000	0.977688	0.848013	0.983276	0.985335	0.018386	0.990060	0.864807	0.895568
GDPC	0.887737	0.986271	1.000000	0.991241	0.977441	0.806905	0.990942	0.993617	0.005786	0.996183	0.826193	0.941470
LF	0.864738	0.981000	0.991241	1.000000	0.983480	0.804745	0.989407	0.994808	0.028874	0.995309	0.823629	0.942885
M1	0.836027	0.977688	0.977441	0.983480	1.000000	0.802322	0.968290	0.990567	-0.006511	0.984956	0.823956	0.916551
PCR	0.850042	0.848013	0.806905	0.804745	0.802322	1.000000	0.815494	0.818720	0.002198	0.837306	0.999025	0.641813
PERCAP	0.897004	0.983276	0.990942	0.989407	0.968290	0.815494	1.000000	0.988084	-0.006175	0.992945	0.833472	0.932285
POP	0.866594	0.985335	0.993617	0.994808	0.990567	0.818720	0.988084	1.000000	0.045698	0.996903	0.838924	0.937340
RESID01	0.023506	0.018386	0.005786	0.028874	-0.006511	0.002198	-0.006175	0.045698	1.000000	0.003449	0.007146	0.046578
TA	0.890182	0.990060	0.996183	0.995309	0.984956	0.837306	0.992945	0.996903	0.003449	1.000000	0.855324	0.932244
TCR	0.856058	0.864807	0.826193	0.823629	0.823956	0.999025	0.833472	0.838924	0.007146	0.855324	1.000000	0.665425
TE	0.777768	0.895568	0.941470	0.942885	0.916551	0.641813	0.932285	0.937340	0.046578	0.932244	0.665425	1.000000

The independent variables are highly correlated. The pair wise correlation matrix of the explanatory variables are uniformly high, all at approximately above 0.90. Although such pair wise correlations are no guarantee that the UE function suffers from the co linearity problem, the possibility exists.

Table 7.3: Auxilliary regression

	Regressand	Regressors	Coefficient	t-Statistic	
	Percap	CPI	2.7013	(29.3667)	
		lnDtax	0.2091	(2.3399)	
		Elect	0.7739	(17.7795)	
		labforce	2.1979	(14.3908)	
		Employed	2.2673	(15.8867)	
		Percap	FEXP	0.1429	(0.7651)
			DUMMY	-0.0828	(-1.1932)
			Dtax	0.0707	(0.6921)
	unemployed		-0.0250	(1.6728)	
		M1 lag-1	-0.1642	(-1.2291)	
		M1	-0.0707	(-0.5272)	

All regression of the explanatory variables showed R^2 value in excess of 0.94. The F tests indicate that R^2 are statistically significant. The significant t-statistic suggests that each explanatory variables in the regression is highly collinear with other explanatory variables.

7.2 Variance test

Standard deviation for the log of UE low estimate (0.3612), UE moderate estimate (0.4189) and UE upper bound (0.4630) estimate, are lower than the variables for GDP (0.5082), M1 aggregates (0.6525), electricity consumption (0.7306), per capita income (0.5921), total crime (0.4212), direct tax revenue (0.8988) and indirect tax revenue (0.5426).

However the variance of the UE is larger than the variance of perception bribe index (0.0315), CPI (0.2315) and employment (0.2683).

Table 7.4: Unit root tests – Augmented Dickey-Fuller test statistic

Variables	Coefficients	t-statistic	Probability (Mackinnon (1996) one –sided p-value
UE low	-0.0777	-1.4418	0.1609
D(UE low[-1])	-1.0535	-5.3802	0.0000
M1	0.3503	1.6454	0.1129
D(M1[-1])	-0.9405	-4.5537	0.0001
Fexp	-0.0777	-1.4418	0.1609
D(Fexp[-1])	-0.7286	-3.2690	0.0030
Elect	-0.0777	-1.4418	0.1609
D(Elect[-1])	-1.0535	-5.3802	0.0000
Labforce	-0.0214	-1.1463	0.2621
D(Labforce[-1])	-0.9360	-4.6670	0.0001
Emp	-0.0218	-1.3511	0.1883
D(Emp[-1])	-1.1400	-5.7430	0.0000
CPI	-0.0357	-2.0963	0.0459
D(CPI[-1])	-0.6878	-4.6854	0.0001
GDPc	-0.0029	-0.1783	0.8598
D(GDPc[-1])	-0.8794	-4.4489	0.0001
GDP percap	-0.0076	-0.3917	0.6985
D(GDPpercap[-1])	-0.8351	-4.2362	0.0003
Crirate	-0.0209	-0.3492	0.7298
D(Crirate[-1])	0.4531	2.2503	0.0339

Note: M1 (Money aggregates of cash and demand deposits), Fexp (Annual federal expenditure), Elect (national electricity consumption), Lab force (national available labor force), Emp (number of employed labor force), CPI (inflation rate), GDP (Gross domestic production at constant level) GDP percap (GDP per population) and Crirate (Total crime index)

All variables at level showed significant unit root (non stationary) but at “difference” root is no longer significant (approximate stationary)

7.3 Cointegration tests

Table 7.5: Co integration tests

Date: 08/08/10 Time: 17:13

Sample (adjusted): 3 30

Included observations: 28 after adjustments

Trend assumption: Linear deterministic trend

Series: LNUEACT LNCPI LNPERCAP LNELECT LNFEXP LNM1

Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.870626	122.2141	95.75366	0.0002
At most 1	0.717713	64.95270	69.81889	0.1150
At most 2	0.441832	29.53741	47.85613	0.7423
At most 3	0.243969	13.21074	29.79707	0.8817
At most 4	0.172935	5.379896	15.49471	0.7672
At most 5	0.002264	0.063472	3.841466	0.8011

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.870626	57.26137	40.07757	0.0003
At most 1 *	0.717713	35.41529	33.87687	0.0325
At most 2	0.441832	16.32667	27.58434	0.6379
At most 3	0.243969	7.830840	21.13162	0.9138
At most 4	0.172935	5.316424	14.26460	0.7015
At most 5	0.002264	0.063472	3.841466	0.8011

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by $b'S_{11}b=I$):

LNUEACT	LNCPI	LNPERCAP	LNELECT	LNFXEXP
3.657301	-71.08848	6.029633	7.337070	2.700401
5.129580	56.38338	-30.48672	-8.553508	16.46736
-5.686766	17.49512	-0.705883	4.918565	-2.111440
-2.081232	-3.402243	-12.22247	11.46772	-4.115073
-1.164878	-4.664760	-3.160779	0.534337	-2.235709
1.289039	-10.34854	10.90455	-10.24758	6.539846

Unrestricted Adjustment Coefficients (alpha):

D(LNUEACT)	-0.085484	-0.068880	0.058650	0.030989
D(LNCPI)	0.007340	-0.001499	-0.001677	-0.000606
D(LNPERCAP)	0.005902	0.023733	-0.006968	0.018099
D(LNELECT)	-0.035131	0.018501	-0.035001	-0.004485
D(LNFXEXP)	-0.003471	-0.016289	-0.021540	0.012184
D(LNM1)	-0.003625	0.032814	0.027783	-0.013225

1 Cointegrating Equation(s): Log likelihood 264.1763

Normalized cointegrating coefficients (standard error in parentheses)

LNUEACT	LNCPI	LNPERCAP	LNELECT	LNFXEXP
1.000000	-19.43741	1.648656	2.006143	0.738359
	(2.18762)	(0.79887)	(0.40945)	(0.28650)

Adjustment coefficients (standard error in parentheses)

D(LNUEACT)	-0.312640
	(0.14505)
D(LNCPI)	0.026846
	(0.00948)
D(LNPERCAP)	0.021584
	(0.04317)
D(LNELECT)	-0.128484
	(0.06985)
D(LNFXEXP)	-0.012695
	(0.04238)
	-0.013259

D(LNM1)

2 Cointegrating Equation(s):		Log likelihood	281.8839		
Normalized cointegrating coefficients (standard error in parentheses)					
LNUEACT	LNCPI	LNPERCAP	LNELECT	LNFEXP	
1.000000	0.000000	-3.200903	-0.340478	2.317356	
		(0.45056)	(0.27612)	(0.17280)	
0.000000	1.000000	-0.249496	-0.120727	0.081235	
		(0.02751)	(0.01686)	(0.01055)	
Adjustment coefficients (standard error in parentheses)					
D(LNUEACT)	-0.665965	2.193242			
	(0.23024)	(3.31601)			
D(LNCPI)	0.019155	-0.606355			
	(0.01619)	(0.23316)			
D(LNPERCAP)	0.143324	0.918602			
	(0.06642)	(0.95668)			
D(LNELECT)	-0.033582	3.540542			
	(0.11746)	(1.69170)			
D(LNFEXP)	-0.096253	-0.671685			
	(0.06930)	(0.99811)			
D(LNM1)	0.155065	2.107909			
	(0.11842)	(1.70557)			

3 Cointegrating Equation(s):		Log likelihood	290.0473		
Normalized cointegrating coefficients (standard error in parentheses)					
LNUEACT	LNCPI	LNPERCAP	LNELECT	LNFEXP	
1.000000	0.000000	0.000000	-1.461715	0.194468	
			(0.37605)	(0.49325)	
0.000000	1.000000	0.000000	-0.208122	-0.084235	
			(0.03193)	(0.04188)	
0.000000	0.000000	1.000000	-0.350288	-0.663215	
			(0.12659)	(0.16605)	
Adjustment coefficients (standard error in parentheses)					
D(LNUEACT)	-0.999492	3.219325	1.543084		
	(0.28951)	(3.15216)	(1.06039)		
D(LNCPI)	0.028690	-0.635688	0.091153		
	(0.02158)	(0.23491)	(0.07903)		
D(LNPERCAP)	0.182952	0.796689	-0.683036		
	(0.08850)	(0.96360)	(0.32416)		
D(LNELECT)	0.165458	2.928202	-0.751152		
	(0.14362)	(1.56373)	(0.52604)		
D(LNFEXP)	0.026239	-1.048529	0.490885		

	(0.08393)	(0.91388)	(0.30743)	
D(LNM1)	-0.002931	2.593979	-1.041876	
	(0.15057)	(1.63938)	(0.55149)	
<hr/>				
4 Cointegrating Equation(s):		Log likelihood	293.9627	
<hr/>				
Normalized cointegrating coefficients (standard error in parentheses)				
LNUEACT	LNCPI	LNPERCAP	LNELECT	LNFXEXP
1.000000	0.000000	0.000000	0.000000	-4.954179
0.000000	1.000000	0.000000	0.000000	-0.817311
0.000000	0.000000	1.000000	0.000000	-1.897045
0.000000	0.000000	0.000000	1.000000	-3.522333
				(1.03249)
Adjustment coefficients (standard error in parentheses)				
D(LNUEACT)	-1.063987	3.113893	1.164321	0.605809
	(0.29187)	(3.08854)	(1.11566)	(0.56159)
D(LNCPI)	0.029952	-0.633625	0.098564	0.051482
	(0.02218)	(0.23474)	(0.08479)	(0.04268)
D(LNPERCAP)	0.145285	0.735113	-0.904245	0.013576
	(0.08398)	(0.88868)	(0.32101)	(0.16159)
D(LNELECT)	0.174792	2.943461	-0.696336	-0.639589
	(0.14762)	(1.56204)	(0.56425)	(0.28403)
D(LNFXEXP)	0.000881	-1.089983	0.341963	0.147643
	(0.08308)	(0.87912)	(0.31756)	(0.15985)
D(LNM1)	0.024594	2.638974	-0.880233	-0.322286
	(0.15286)	(1.61754)	(0.58430)	(0.29412)
<hr/>				
5 Cointegrating Equation(s):		Log likelihood	296.6209	
<hr/>				
Normalized cointegrating coefficients (standard error in parentheses)				
LNUEACT	LNCPI	LNPERCAP	LNELECT	LNFXEXP
1.000000	0.000000	0.000000	0.000000	0.000000
0.000000	1.000000	0.000000	0.000000	0.000000
0.000000	0.000000	1.000000	0.000000	0.000000
0.000000	0.000000	0.000000	1.000000	0.000000
0.000000	0.000000	0.000000	0.000000	1.000000
Adjustment coefficients (standard error in parentheses)				
D(LNUEACT)	-1.109457	2.931807	1.040942	0.626666
	(0.28422)	(2.98501)	(1.08171)	(0.54235)
D(LNCPI)	0.024871	-0.653969	0.084779	0.053812
	(0.02066)	(0.21700)	(0.07864)	(0.03943)
D(LNPERCAP)	0.137023	0.702030	-0.926661	0.017365
	(0.08356)	(0.87761)	(0.31803)	(0.15945)
D(LNELECT)	0.148485	2.838113	-0.767718	-0.627522
	(0.14211)	(1.49251)	(0.54085)	(0.27118)

D(LNFEXP)	0.006971 (0.08318)	-1.065595 (0.87355)	0.358487 (0.31656)	0.144850 (0.15872)
D(LNM1)	0.032913 (0.15357)	2.672289 (1.61284)	-0.857658 (0.58446)	-0.326103 (0.29304)

Though the different data series are individually non stationary, they are cointegrated i.e. stationary in long run relationship

7.4 Pairwise GRANGER Causality tests

Sample: 1980 2008

To examine the extent of the causalities between two variables -, we employ the Granger causality tests. It indicates whether there is sufficient evidence to reject the null hypothesis of no causal relationship as summarized in the following table at 95% significant level and lags of 2.

Hypothesis one

Ho: UE growth does not influence x1

Hypothesis two

Ho: x1 does not influence UE growth

Granger tests fail to show any evidence of causality between UE and most of the variables, suggesting that the significant coefficient in the regression only reflects “mere” correlation with no causal correlation.

However there is significant evidence to reject the null hypothesis of no causal correlation between UE in the upper level and federal expenditure. It suggests that there is some evidence of UE in the upper level will cause a change in the federal expenditure.

(F=3.9619, p=0.0332),, but not vice versa (F=0.6459, p=0.5335)

Although statistically significant, however Granger causality does not imply true causality as Granger test is designed to handle pairs of variables, and may produce misleading results when the true relationship involves three or more variables. A similar test involving more variables can be applied with vector autoregression, however this is not the objective of the study, perhaps is useful for future study.

Table 7.6: Pairwise Granger Causality tests

Pairwise Granger Causality Tests (for lower level of UE)

Date: 08/08/10 Time: 17:15

Sample: 1 30

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LNFXP does not Granger Cause LNUEACT	28	0.67233	0.5203
LNUEACT does not Granger Cause LNFXP		3.32506	0.0539
LNELECT does not Granger Cause LNUEACT	28	1.79384	0.1888
LNUEACT does not Granger Cause LNELECT		1.38553	0.2703
LNCPPI does not Granger Cause LNUEACT	28	1.14471	0.3358
LNUEACT does not Granger Cause LNCPPI		0.51660	0.6033
LNPERCAP does not Granger Cause LNUEACT	28	0.54145	0.5891
LNUEACT does not Granger Cause LNPERCAP		0.69423	0.5096
LNELECT does not Granger Cause LNFXP	28	2.23608	0.1296
LNFXP does not Granger Cause LNELECT		0.54174	0.5890
LNCPPI does not Granger Cause LNFXP	28	2.80988	0.0809
LNFXP does not Granger Cause LNCPPI		0.33462	0.7190
LNPERCAP does not Granger Cause LNFXP	28	6.72044	0.0050
LNFXP does not Granger Cause LNPERCAP		0.61831	0.5476
LNCPPI does not Granger Cause LNELECT	28	2.37744	0.1152
LNELECT does not Granger Cause LNCPPI		2.29371	0.1235
LNPERCAP does not Granger Cause LNELECT	28	0.94120	0.4047
LNELECT does not Granger Cause LNPERCAP		4.27672	0.0264
LNPERCAP does not Granger Cause LNCPPI	28	2.78371	0.0827
LNCPPI does not Granger Cause LNPERCAP		3.28958	0.0554

Pairwise Granger Causality Tests (for moderate level of UE)

Date: 08/08/10 Time: 17:17 Sample: 1 30 Lag:s 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LNM1 does not Granger Cause UEACTION1	27	2.64632	0.0934
UEACTION1 does not Granger Cause LNM1		0.11898	0.8884
LNCPI does not Granger Cause UEACTION1	27	1.41458	0.2643
UEACTION1 does not Granger Cause LNCPI		0.50013	0.6132
LNPERCAP does not Granger Cause UEACTION1	27	0.34353	0.7130
UEACTION1 does not Granger Cause LNPERCAP		1.64805	0.2153
LNELECT does not Granger Cause UEACTION1	27	0.38776	0.6831
UEACTION1 does not Granger Cause LNELECT		2.00248	0.1589
LNFEXP does not Granger Cause UEACTION1	27	0.42861	0.6567
UEACTION1 does not Granger Cause LNFEXP		2.59786	0.0971
LNCPI does not Granger Cause LNM1	28	0.48950	0.6192
LNM1 does not Granger Cause LNCPI		1.74462	0.1970
LNPERCAP does not Granger Cause LNM1	28	1.19419	0.3210
LNM1 does not Granger Cause LNPERCAP		2.46433	0.1072
LNELECT does not Granger Cause LNM1	28	1.19141	0.3219
LNM1 does not Granger Cause LNELECT		1.14222	0.3366
LNFEXP does not Granger Cause LNM1	28	2.55635	0.0994
LNM1 does not Granger Cause LNFEXP		4.12914	0.0294
LNPERCAP does not Granger Cause LNCPI	28	2.78371	0.0827
LNCPI does not Granger Cause LNPERCAP		3.28958	0.0554
LNELECT does not Granger Cause LNCPI	28	2.29371	0.1235
LNCPI does not Granger Cause LNELECT		2.37744	0.1152
LNFEXP does not Granger Cause LNCPI	28	0.33462	0.7190
LNCPI does not Granger Cause LNFEXP		2.80988	0.0809
LNELECT does not Granger Cause LNPERCAP	28	4.27672	0.0264
LNPERCAP does not Granger Cause LNELECT		0.94120	0.4047
LNFEXP does not Granger Cause LNPERCAP	28	0.61831	0.5476
LNPERCAP does not Granger Cause LNFEXP		6.72044	0.0050
LNFEXP does not Granger Cause LNELECT	28	0.54174	0.5890
LNELECT does not Granger Cause LNFEXP		2.23608	0.1296

Pairwise Granger Causality Tests (for upper level of UE)

Date: 08/08/10 Time: 17:18

Sample: 1 30

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LNFXP does not Granger Cause LNUESTHIGH	28	0.64585	0.5335
LNUESTHIGH does not Granger Cause LNFXP		3.96190	0.0332
LNELECT does not Granger Cause LNUESTHIGH	28	2.03783	0.1532
LNUESTHIGH does not Granger Cause LNELECT		1.35362	0.2781
LNCPPI does not Granger Cause LNUESTHIGH	28	0.97999	0.3904
LNUESTHIGH does not Granger Cause LNCPPI		0.92354	0.4113
LNPERCAP does not Granger Cause LNUESTHIGH	28	0.90581	0.4182
LNUESTHIGH does not Granger Cause LNPERCAP		0.68028	0.5164
LNELECT does not Granger Cause LNFXP	28	2.23608	0.1296
LNFXP does not Granger Cause LNELECT		0.54174	0.5890
LNCPPI does not Granger Cause LNFXP	28	2.80988	0.0809
LNFXP does not Granger Cause LNCPPI		0.33462	0.7190
LNPERCAP does not Granger Cause LNFXP	28	6.72044	0.0050
LNFXP does not Granger Cause LNPERCAP		0.61831	0.5476
LNCPPI does not Granger Cause LNELECT	28	2.37744	0.1152
LNELECT does not Granger Cause LNCPPI		2.29371	0.1235
LNPERCAP does not Granger Cause LNELECT	28	0.94120	0.4047
LNELECT does not Granger Cause LNPERCAP		4.27672	0.0264
LNPERCAP does not Granger Cause LNCPPI	28	2.78371	0.0827
LNCPPI does not Granger Cause LNPERCAP		3.28958	0.0554

Pairwise Granger Causality Tests (for upper level of UE of lag1)

Date: 08/08/10 Time: 17:19

Sample: 1 30

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LNFEXP does not Granger Cause UEHIGH1	27	0.04306	0.9579
UEHIGH1 does not Granger Cause LNFEXP		2.91747	0.0752
LNELECT does not Granger Cause UEHIGH1	27	0.33784	0.7169
UEHIGH1 does not Granger Cause LNELECT		1.92467	0.1697
LNCPI does not Granger Cause UEHIGH1	27	0.77593	0.4725
UEHIGH1 does not Granger Cause LNCPI		1.74249	0.1984
LNPERCAP does not Granger Cause UEHIGH1	27	0.87253	0.4319
UEHIGH1 does not Granger Cause LNPERCAP		0.81726	0.4546
LNMI does not Granger Cause UEHIGH1	27	1.91047	0.1718
UEHIGH1 does not Granger Cause LNMI		0.34097	0.7148
LNELECT does not Granger Cause LNFEXP	28	2.23608	0.1296
LNFEXP does not Granger Cause LNELECT		0.54174	0.5890
LNCPI does not Granger Cause LNFEXP	28	2.80988	0.0809
LNFEXP does not Granger Cause LNCPI		0.33462	0.7190
LNPERCAP does not Granger Cause LNFEXP	28	6.72044	0.0050
LNFEXP does not Granger Cause LNPERCAP		0.61831	0.5476
LNMI does not Granger Cause LNFEXP	28	4.12914	0.0294
LNFEXP does not Granger Cause LNMI		2.55635	0.0994
LNCPI does not Granger Cause LNELECT	28	2.37744	0.1152
LNELECT does not Granger Cause LNCPI		2.29371	0.1235
LNPERCAP does not Granger Cause LNELECT	28	0.94120	0.4047
LNELECT does not Granger Cause LNPERCAP		4.27672	0.0264
LNMI does not Granger Cause LNELECT	28	1.14222	0.3366
LNELECT does not Granger Cause LNMI		1.19141	0.3219
LNPERCAP does not Granger Cause LNCPI	28	2.78371	0.0827
LNCPI does not Granger Cause LNPERCAP		3.28958	0.0554
LNMI does not Granger Cause LNCPI	28	1.74462	0.1970
LNCPI does not Granger Cause LNMI		0.48950	0.6192
LNMI does not Granger Cause LNPERCAP	28	2.46433	0.1072
LNPERCAP does not Granger Cause LNMI		1.19419	0.3210

Table 7.7: List of variables used in the regression models

	Variable	Definition
1	Federal expenditure	Aggregate treasury expenses (1980-2009)
2	CPI	Average level of prices of a fixed basket of goods and services in Malaysia based on the relative CPI of the 1980 series (base period).
3	GDP	The net total value of goods and services – computed by type of expenditure which is valued at purchaser's values and at factor cost
4	GDP real	GDP at real price – after considering the inflation factor (CPI 1980 series)
5	GDP nominal	GDP at current price
6	GDP nominal percapita	GDP nominal per population
7	GDP real percapita	GDP real per population
8	Electricity	Electricity consumption in KWh inclusive of domestic, public lighting, industry, commercial and mining use.
9	Economic structure change	Pre and post 1997-98 crisis (Dummy; 0.1)
10	Bribery index	Corruption perception index as published by Transparency International by ordering the countries of the world according to the degree which corruption is perceived to exist any public officials and politicians
11	Bribery reports	Number of bribery reports to Anti Corruption Agency
12	Unemployment	Include those who are actively and inactively unemployed
13	Crime rate	Number of violent, property and commercial criminals (Police force)
14	Cash in circulation	Total RM currency issued less vault cash with commercial banks
15	M1 aggregate	Cash RM currency in circulation plus demand deposits of private sector
16	Direct tax revenue	Comprise of income tax, petroleum tax, stamp duties, RPGT, etc
17	Indirect tax revenue	Comprise of excise duties, sales tax, import duty, taxes on commodities and smuggling
18	Population	Number of people recorded in the country

Table 7-8: UE in full models

Model	Variables	Size			Diagnostic tests		
		Low	Moderate	High	Low	Moderate	High
		Coefficient (t statistics)			Error size AIC SIC R ² F Diagnostic tests Serial correlation (BGLM)* Heteroskedasticity (BPG)** Model specification (RReset)^		
1.Full	A.						
	Federal expenditure	-1.7621 (-4.0053)	-1.8185 (-4.5090)	-2.0189 (-4.5952)	-0.1197 0.2643	-0.2936 0.0903	-0.1224 0.2615
	Per-capita	2.3092 (3.0646)	2.2852 (3.3084)	2.2614 (3.0053)	R² = 0.9500 F = 51.4876	R² = 0.9673 F = 80.3653	R² = 0.9652 F = 75.2257
	Electricity	0.6197 (1.2558)	0.7194 (1.5903)	0.8616 (1.7483)			
	Total crime rate	-0.3828 (-1.0018)	-0.5312 (-1.6653)	-0.5731 (-1.6495)	F(2,17) =0.0848	F(2,17) =0.1593	F(2,17) =0.2164
	Unemployed	0.3926 (0.5473)	0.0331 (0.5032)	0.0440 (0.6145)	F(7,19) =0.2167	F(7,19) =0.5131	F(7,19) =0.5947
	M1lag3	0.08173 (0.3780)	0.1376 (0.6945)	0.1590 (0.7365)	F(1,18) =0.0703	F(1,18) =0.0400	F(1,18)
	Dummy	0.3265 (1.1306)	0.5617 (2.1216)	0.7380 (2.5586)			=0.0149
	B.						
	Federal expenditure	-1.2185 (-2.4232)	-1.2438 (-2.7559)	-1.4031 (-2.9992)	0.0236 0.4076	-0.1924 0.1953	-0.12075 0.2632
	CPI	3.5024 (2.3666)	3.7721 (2.83957)	4.1270 (2.9974)	R² = 0.9422 F = 44.2500	R² = 0.9638 F = 72.3683	R² = 20.9651 F = 75.0941
	Electricity	1.0029 (2.1227)	1.0238 (2.4142)	1.0664 (2.4260)			
	Total crime rate	-0.2942 (-0.7927)	-0.4633 (-1.3961)	-0.5316 (-1.5454)	F(2,17) =0.2150	F(2,17) = 0.2677	F(2,17) =0.5255
	Unemployed	-0.0541 (-0.7019)	-0.0630 (-0.9107)	-0.05587 (-0.7789)	F(7,19) =0.0616	F(7,19) =0.2096	F(7,19) =0.2311
M1lag3	-0.02993 (-0.1066)	-0.0153 (-0.0609)	-0.0471 (-0.1804)	F(1,18) =0.2359	F(1,18) = 0.1172	F(1,18) =0.0473	
Dummy	0.3246 (1.0226)	0.5849 (2.0531)	0.7933 (2.6865)				

Note: Significant coefficients and diagnostic tests are as shaded.

Full nominal model – the most elastic variable is CPI

Table 7.9: UE in reduced models of nominal variables

Model	Variables	Size			Diagnostic tests		
		Low	Moderate	High	Low	Moderate	High
		Coefficient			AIC and SIC		
1.Common	A. Federal expenditure Per-capita Electricity	-1.4524	-1.2712	-1.2282	-0.2858 -0.0972	-0.4171 -0.2303	-0.0882 0.1004
		1.9538	1.9309	1.8154			
		0.7522	0.7890	0.9104			
	B. Federal expenditure CPI Electricity	-1.1147	-0.9479	-0.9844	-0.3694 -0.1808	-0.3804 -0.1935	-0.1550 0.0320
		3.2268	3.3076	3.3126			
		1.0041	1.0082	1.1031			
2. Cash	Federal expenditure Cash Electricity	-1.0353	-0.8553	-0.8365	-0.3427 -0.1541	-0.2779 -0.0893	0.0193 0.2078
		1.2403	1.1546	1.0182			
		0.7964	0.8947	1.0706			
3.M1 aggregate	Federal expenditure M1 Electricity	-1.1226	-1.1010	-1.1306	-0.1070 0.0798	-0.1561 0.0307	0.0385 0.2253
		0.3593	0.3845	0.3751			
		1.6052	1.6505	1.7504			
4. Lag UE - 1	A. Federal expenditure Cash Electricity			-1.1773			-0.3433
				1.3765			-0.1547
				0.9853			
	B. Federal expenditure Percap Electricity			-1.5774			-0.2027
				1.9160			-0.0141
				1.0843			
	C. Federal expenditure- lag1 M1-lag1 Electricity-lag1			-1.5218			-0.2173
				0.5140			-0.02874
				1.8586			
5. Tax	A. Federal expenditure CPI Direct tax	-1.3826	-1.0242	-0.9953	-0.1654 -0.2236	-0.4513 -0.2134	-0.1839
		3.9585	6.0121	6.9169			0.0540
		0.8266	NS	NS			
	B. Federal expenditure CPI indirect tax lag-1	-0.8089	-0.8834	-0.9866	-0.3166 -0.1281	-0.5222 -0.2844	-0.2521
		4.2642	5.6480	6.2406			-0.0142
		0.5482	NS	NS			
6. Dummy	A. Federal expenditure Per-capita Electricity Dummy	-1.5025	-1.5251	-1.6363	-0.3543 -0.1207	-0.4174 -0.1817	-0.2868
		2.0491	2.1453	2.1541			-0.0533
		0.6692	0.6979	0.7710			
	B Federal expenditure CPI Electricity F Dummy	NS	NS	0.4066			
		-1.1064	-1.2340	-1.511	-0.2580 -0.2443	0.3196 -0.0393	-0.2657
		3.2851	3.6721	3.8346			-0.0322
	0.9618	0.9857	1.0193				
		NS	NS	0.3464			

Appendix

...continue	C Federal expenditure Cash Electricity Dummy	-1.2509	-1.1776	1.2793			
		1.4644	1.4896	1.4784	-0.3718	-0.4267	-0.2324
		0.6338	0.6516	0.7366	-0.1361	-0.1909	0.0033
		-0.2606	-0.3896	0.5352			
Model	Variables	Coefficient			AIC and SIC		
		Low	Moderate	Low	Moderate	Low	Moderate
		Size			Diagnostic tests		

Notes:

These are the models with significant coefficients except for the ones labeled as NS.

All selected models show R^2 above 0.9 with significant F values and show no evidence of serial correlation (sBGM test), heteroskedasticity disturbances (hBPG test) and model specification error (Rreset test). Insignificant coefficients are denoted as NS (shaded). Models of Upper UE series showed the smallest AIC and SIC ,representing the best fit model.

Nominal model is most elastic to CPI. The nominal models are compared with the real models, the best fit models are selected for interpretation. The models are GDP (A) model, Cash model (2), Lag model (B) and Tax model (B).

When the models were inserted for AR (1), all variable coefficients are insignificant except for CPI and GDP per capita, an indication of ong run relationship.

Table 7.10: UE in reduced models of real variables

Model	Variables	Coefficient	t- statistics	C	H	M
1.GDP (Us UE)	A. Federal expenditure Per-capita Electricity	-0.8941	-4.0232	F-statistic 1.9052 F(2,24) 0.1706	F-statistic 2.8050 F(3,26) 0.0503	F-statistic 0.5846 F(1,25) 0.4517
		0.5758	1.5357			
		1.2665	5.8975			
	B. Federal expenditure CPI Electricity	-0.6146	-2.983	F-statistic 2.9563 F(2,23) 0.0720	F-statistic 1.7527 F(3,25) 0.1820	F-statistic 0.0330 F(1,24) 0.8574
		1.6673	1.7240			
		0.9643	2.8463			
2. Cash (Us UE)	Federal expenditure Cash Electricity	-0.7266	-4.1494	F-statistic 0.3623 F(2,24) 0.6998	F-statistic 2.7849 F(3,26) 0.0584	F-statistic 0.3459 F(1,25) 0.5617
		0.9676	2.2079			
		0.9210	3.0212			
3.M1 (Us UE)	Federal expenditure M1 Electricity	-0.7694	-3.9818	F-statistic 1.8588 F(2,24) 0.1776	F-statistic 1.9670 F(3,26) 0.1437	F-statistic 0.1913 F(1,25) 0.6656
		0.1946	1.2527			
		1.3640	7.3079			
4. Lag UE- 1 (Us UE)	A. Federal expenditure Cash Electricity	-0.9533	-5.4332	F-statistic 1.2316 F(2,23) 0.3104	F-statistic 4.2643 F(3,25) 0.0146	F-statistic 1.1844 F(1,24) 0.2873
		1.2582	3.1872			
		0.8399	3.0054			
	B. Federal expenditure Percap Electricity	-1.1579	-5.3431	F-statistic 1.4412 F(2,23) 0.2572	F-statistic 0.5171 F(3,25) 0.6743	F-statistic 1.0956 F(1,24) 0.3057
		0.7401	2.1582			
		1.28881	5.863			
	C. Federal expenditure M1 Electricity	-1.0694	-5.3989	F-statistic 3.0196 F(2,23) 0.0685	F-statistic 3.01966 F(2,23) 0.0685	F-statistic 0.0512 F(1,24) 0.8229
		0.3065	2.1532			
		1.3916	7.9070			
5. Tax (Ls UE)	A. Federal expenditure CPI Direct tax lag-1	-0.3652	-1.2878	F-statistic 3.7898 F(2,23) 0.0378	F-statistic 0.6467 F(3,25) 0.5923	F-statistic 13.2736 F(1,24) 0.0013
		3.9604	5.8512			
		-0.2265	-0.6327			
	B. Federal expenditure CPI indirect tax lag-1	-0.5574	-3.3429	F-statistic 4.1137 F(2,23) 0.0297	F-statistic 0.3005 F(3,25) 0.8247	F-statistic 0.9933 F(1,24) 0.3289
		3.1446	7.3728			
		0.4615	2.0266			

6. Dummy (Us UE)	A. Federal expenditure Per-capita Electricity Dummy	-0.8779	-2.5822	F-statistic	F-statistic	F-statistic
		0.5636	1.3183	1.8116	3.1278	0.5614
		1.2710	5.5251	F(2,23)	F(4,25)	F(1,24)
		0.0138	0.0641	0.1859	0.0324	0.4610
	B Federal expenditure CPI Electricity Dummy	-0.4305	-1.4420	F-statistic	F-statistic	F-statistic
		1.5741	1.6088	2.7077	1.7363	0.0323
		0.9666	2.8375	F(2,22)	F(4,24)	F(1,23)
		0.1754	0.8559	0.0889	0.1749	0.8588
	C Federal expenditure Cash Electricity Dummy	-0.6889	-2.7936	F-statistic	F-statistic	F-statistic
		0.9418	2.0401	0.3639	3.7949	0.3270
		0.9342	2.9820	F(2,23)	F(4,25)	F(1,24)
		0.0422	0.2209	0.6989	0.0152	0.5727

Notes:

These are the models with significant coefficients and fit statistical tests except for the shaded ones.

The dependent variable in real model is the UE in the upper series except for the Tax model , the dependent variable is the UE in the lower series.

All selected models show R^2 above 0.9 with significant t and F values and show no evidence of serial correlation (C - sBGM test), heteroskedasticity disturbances (H - hBPG test) and model specification error (M - Rreset test), except for shaded ones.

Table 7.11: Ten equations of nominal models showing significant variables.

1	Us UE	= F (percapita income, federal expenditure, electricity) 28.22383 + 1.8154 pc – 1.2282 fe + 0.9104 el (6.7711) (3.3702) (-4.3766) (2.3238)
2	Us UE	= F (CPI, federal expenditure, electricity) 20.1298 + 3.3076 cpi – 0.9844 fe + 1.1031 el (5.5961) (3.5931) (-4.3486) (3.3513)
3	Us UE	= F (cash in circulation, federal expenditure, electricity) 23.8182 + 1.0182 c – 0.8365 fe + 1.0706 el (5.7650) (2.7667) (-3.1555) (2.6226)
4	Us UE	= F (M1 aggregate, federal expenditure, electricity) 25.0024 + 0.3751m1 – 1.1307 fe + 1.7505 el (6.5939) (2.4627) (-4.1660) (6.8356)
5	Ls UE	= F (CPI, federal expenditure, direct tax revenue of lag-1) 18.2523 + 3.9585 cpi – 1.3826 fe + 0.8266 dtx -1 (6.8273) (4.9037) (-4.1006) (2.4515)
6	Ls UE	= F (CPI, federal expenditure, indirect tax revenue of lag-1) 9.3417 + 4.2642 cpi – 0.8089 fe + 0.5482 indtx -1 (2.7585) (5.57574) (-3.8456) (2.3782)
7	Us UE	= F (percapita income, federal expenditure, electricity, pre-post 1997-98 economic crises) 36.5081 + 2.1541 pc – 1.6363 fe + 0.7710 el + 0.4066 cr (8.1271) (4.3040) (-5.9668) (2.2049) (2.5612)
8	Us UE	= F (CPI, federal expenditure, electricity, pre-post 1998-99 economic crises) 25.1938 + 3.6721 cpi – 1.5110 fe + 1.0193 el + 0.3464 cr (6.1916) (4.1970) (-5.1472) (3.2929) (2.2024)
9	Us UE	= F (cash, federal expenditure, electricity, pre-post 1998-99 economic crises) 33.6325 + 1.4784 c – 1.2793 fe + 0.7366 el + 0.5352 cr (6.9350) (4.1694) (-4.6798) (1.9809) (3.0121)
10	Us UE (lag of one)	= F (percapita, federal expenditure, electricity) 34.2208 + 1.9160 pc – 1.5774 fe + 1.0843 el (8.6891) (3.7644) (-5.9523) (2.9308)

Note: The equations that are bolded denote that the variables are also significant in real models. In other words, the equations in bold denote UE models that are not likely to associate with CPI.

Table 7.12: Ten equations of real models to compare with nominal models

1	Us UE	= F (percapita income, federal expenditure, electricity) - evidence of heteroskedasticity $18.4577 + 0.5783 pc - 0.8941 fe + 1.2665 el$ (7.1543) (1.5357) (-4.0232) (5.8975)
2	Us UE	= F (CPI, federal expenditure, electricity) $12.7219 + 1.3373 cpi - 0.6146 fe + 0.9643 el$ (3.7496) (1.7240) (-2.9831) (2.8463)
3	Us UE	= F (cash in circulation, federal expenditure, electricity) $5.9858 + 0.9676 c - 0.7266 fe + 0.9210 el$ (1.0810) (2.2078) (-4.1495) (3.0512)
4	Us UE	= F (M1 aggregate, federal expenditure, electricity) $16.4899 + 0.1946 m1 - 0.7694 fe + 1.3640 el$ (66972) (1.2527) (-3.9818) (7.3079)
5	Ls UE	= F (CPI, federal expenditure, direct tax revenue of lag-1) - evidence of serial correlation and model specification error $11.6719 + 2.5870 cpi - 0.8984 fe + 0.6276 dtx - 1$ (5.9555) (3.8819) (-3.3050) (1.8305)
6	Ls UE	= F (CPI, federal expenditure, indirect tax revenue of lag-1) $5.4216 + 3.1446 cpi - 0.5574 fe + 0.4615 indtx - 1$ (1.7468) (7.3728) (-3.3429) (2.1266)
7	Us UE	= F (percapita income, federal expenditure, electricity, pre-post 1998-99 economic crises) - evidence of heteroskedasticity $18.1888 + 0.5636 pc - 0.8779 fe + 1.2710 el + 0.01382 cr$ (3.6752) (1.3186) (-2.5822) (5.5251) (0.0641)
8	Us UE	= F (CPI, federal expenditure, electricity, pre-post 1998-99 economic crises) $9.4286 + 1.5741 cpi - 0.4305 fe + 0.9665 el + 0.1753 cr$ (1.8336) (1.6088) (-1.4420) (2.8375) (0.8559)
9	Us UE	= F (cash, federal expenditure, electricity, pre-post 1998-99 economic crises) - evidence of heteroskedasticity $5.5561 + 0.9417 c - 0.6889 fe + 0.9342 el + 0.0421 cr$ (0.9386) (2.0401) (-2.7936) (2.9820) (0.2207)
10	Us UE (lag of one)	= F (percapita, federal expenditure, electricity) $22.0541 + 0.7401 pc - 1.1579 fe + 1.2881 el$ (8.2867) (2.1582) (-5.3431) (5.8631)

Note: Shaded figures denote insignificant coefficients. The equations in bold denote UE models that are not likely to associate with CPI

Table: 7.13: UE models - insignificant coefficients among cash, M1 aggregates, GDP per capita and CPI collectively.

Model	Variables	UE Size			UE Size					
		Low	Moderate	High	Low	Moderate	High			
		Coefficient			AIC and SIC					
M1 interact with percapita income or CPI	A. Federal expenditure Per-capita Electricity M1	-1.4477	-1.3151	-1.3253	-0.3684	-0.3982	-0.9440			
		1.6992	1.6159	1.4696						
		0.7789	0.8648	1.0359						
		NS	NS	NS						
	B. Federal expenditure CPI Electricity M1	-1.058	-0.9844	-1.0110	-0.2584	-0.3190	-0.0906			
		3.0106	3.0060	3.0843						
		1.0012	1.0475	1.1317						
		NS	NS	NS						
Cash interact with percapita income or CPI	A* Federal expenditure Per-capita Electricity Cash	-1.3011	-1.1486	-1.1411	-0.4250	-0.3834	-0.0490			
		NS	NS	NS						
		NS	NS	NS						
		NS	NS	NS						
	B* Federal expenditure CPI Electricity Cash	-1.0832	-0.9175	-0.9144	-0.3593	-0.3472	-0.0747			
		NS	NS	NS						
		NS	0.7888	0.9380						
		NS	NS	NS						

*Evidence of serial correlation or /& heteroscedascity or/& model specification error. NS (shaded) denote insignificant coefficient

Table: 7.14: Models of the official economy - insignificant “electricity consumption”

Model	Variables	OFFICIAL ECONOMY (GDP)	
		Coefficient	AIC and SIC
Federal expenditure model	A* Federal expenditure-CPI Electricity	0.2831	-2.3592
		1.9129	
		NS	
	B* Federal expenditure-Per capita Electricity	NS	-3.7814
		1.3296	
		NS	
	C. Federal expenditure-Cash Electricity	0.3322	-2.3846
		0.7171	
		NS	

*Evidence of serial correlation or /& heteroscedascity or/& model specification error. NS (shaded) denote insignificant coefficient

Table: 7.15: Models of the potential economy - insignificant “federal expenditure”

Model	Variables	TOTAL ECONOMY					
		Low UE	Moderate UE	High UE	Low UE	Moderate UE	High UE
		Coefficient			AIC and SIC		
Federal expenditure model	A*						
	Federal expenditure	NS	NS	NS			
	CPI	2.0154	2.0950	2.1158	-2.3067	-2.2482	-2.2072
	Electricity	0.3386	0.3789	0.3984	-2.1198	-2.0614	-2.0204
	B*						
	Federal expenditure	NS	NS	NS			
	Per capita	1.3723	1.3617	1.3487	-3.3443	-2.9602	-2.7507
	Electricity	NS	NS	NS	-3.1575	-2.7734	-2.5639
	C*						
	Federal expenditure-Cash	0.1913	NS	NS			
		0.7667	0.7553	0.7292	-2.3289	-2.1493	-1.1992
	Electricity	NS	NS	NS	-2.1402	-1.9607	-1.8035

*Evidence of serial correlation or /& heteroscedascity or/& model specification error. NS (shaded) denote insignificant coefficient