LEBANESE AMERICAN UNIVERSITY

A REVIEW OF THE NATIONAL INCOME ACCOUNTING APPROACHES IN LEBANON

by
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AN ABSTRACT OF THE PROJECT OF

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National income is the value of the country's productive activity defined as the Gross National Product (GNP) or Gross Domestic Product (GDP). It is considered a very important concept because its increase, which is economic growth, is not only a measure of the national increase in wealth, but is also a measure of the increase in the freedom of choice in the economy. Due to the importance of this concept and the existence of several methods to measure the Lebanese national aggregates in the absence of updated official statistics, this paper will examine, compare and evaluate the various available approaches.

The Central Statistics Department is the only official organization using an input-output model while the Council for Development and Reconstruction is the sole provider of a macroeconomic long term forecast. The Horizon 2000 CDR national accounts are a function of, mainly, public finance accounts based on highly optimistic and unrealistic assumptions. The third model is that of Banque Audi, which presented its first macroeconomic aggregates in the early nineties when, no other source was publishing such data. Its model is formed of exogenous and endogenous parameters that are computed according to the flow of income of the different agents in the economy, based on the interaction between the money market and the real market.

On the other hand, due to the lack of reliable and accurate data, the Central Bank of Lebanon and Banque Audi resorted to barometric indicators to detect the direction of economic trends. The Central Bank's index of coincident indicators is weighted according to the degree of correlation. Banque Audi's sectoral index is constituted of sectoral indicators weighted according to GDP structure adjusted by some personal opinion.

Finally, all discussed models can not be considered macroeconometric models because though the macroeconomic approach exists the reliability and availability of data and the econometric methodology are still rudimentary. Nevertheless, the difficulty of obtaining data and the degree of its importance in calculating national income can determine the priorities to be followed in improving the GDP & GNP estimation in Lebanon.

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LIST OF ABBREVIATIONS

A	The increase in the productivity or efficiency in the usage of factors of production
a	Private investment import coefficient
Audi	Banque Audi sal
b	Public investment import coefficient
c	A consumption import coefficient
C	Consumption
CDR	Council of Development & Reconstruction
CPI	Consumer price index
Cpr	Private consumption
Cpro	Autonomous private consumption
Cpu	Public consumption
CSD	Central Statistics Department
d	An import coefficient for intermediate imports
DY	Disposable income
ECE	Etude et Consultation Economique sarl
EIU	Economist Intelligence Unit
F	A variable measuring the shift in the production function
g	The GDP growth rate
GDP	Gross domestic product
GNP	Gross national product
I	Investment spending
ICOR or k	Incremental capital output ratio

IMF	International Monetary Fund
Ipr	Private investment spending
Ipu	Public investment spending
K	The stock of capital
KWH	Kilowatt-hours
L	The stock of land
LBP	Lebanese pounds
M	Imports
M3	Money supply
MPC	Marginal propensity to consume
na	Figures not available
NNP	Net national product
P	The price level
R	The stock of land and natural sources
s	The national saving rate
t	A time period
UNDP	United Nations Development Program
US$	United States Dollars
X	Export
Y	National income
W	Weight allocated to a variable
Δ	Change

CHAPTER ONE

INTRODUCTION

For the past decade, a main concern of economists has been to promote economic growth. In particular, underdeveloped nations are often valued by the degree to which their national product is growing. Every year, all over the world, statistics are compiled to measure national income and its variations assessing the expansion in the economy.

Lebanon after a lengthy and destructive civil war was able to launch an ambitious reconstruction and development program. However, physical damage and the population's displacement were not the only consequences of the war. Public institutions were severely weakened and consequently, reliable data could not be officially collected to assess the economy's performance.

Facing political and economic challenges, nevertheless, the appointment of Prime Minister Rafic Hariri and his government, in 1992, was the starting point of a new era. The heavy burden of promoting the country began by launching the reconstruction plan with the objective of ensuring macroeconomic stability, as well as, physical, and social infrastructure rehabilitation.

The plan was initiated while official sources releasing statistics were still unable to provide the government with accurate national aggregates to monitor the development

of the country. Indeed, the growth of the Lebanese economy, specifically, national income was difficult to calculate and follow up.

Independent entities in Lebanon, formulated different methodologies to approach this problem. Different functional and fundamental relationships were used in the formulation of a set of national aggregates based on various hypothetical assumptions, and on available and relevant parameters. As a result, forecasts to detect trends might not be accurate yet they form the framework for operations in an ambiguous environment.

In light of the volatile macroeconomic conditions, and the importance of such an economic yardstick, at both national and international levels, it was important and interesting to study the available Lebanese models on national accounts. Though the reliability remains questionable because most of the available economic models are not published, this study will try to provide a better understanding of the models by analyzing each one according to some published information and conducted interviews. Furthermore, the comparison and evaluation of the models will serve to highlight their strengths and weaknesses.

The main sources, considered because of their high degree of reliability, are the Central Statistics Department (CSD), the Council of Development and Reconstruction (CDR), the Central Bank and Banque Audi S.A.L. It is important to note that only the CSD has published the method used in computing national accounts. The other references

partially disclosed their approaches during special interviews while the CDR's model was extracted from the Horizon 2000 Reconstruction and Development main report.

The Ministry of Finance claimed during a personal interview not to possess any specific system of national accounting. Instead, it cooperated with the International Monetary Fund and the World Bank to publish some official figures.[1]

Before going through each methodology, an overview of the definition of economic growth, its causes and characteristics in addition to the concept of national income and the various approaches to measure it, will be introduced.

After the introductory chapter, another will follow describing results of the official department in charge of national statistics in Lebanon the CSD. Using an input-output model to calculate 1994 and 1995 GDP, the CSD could not provide any information on 1997's national income.

The Horizon 2000; a 12 years forecast plan formulated by the CDR will be exhibited in chapter three. The fourth chapter is about Banque Audi's model. Subsequently, describing the general direction of the economy, the Central Bank and Banque Audi's economic barometers are discussed in the fifth chapter. The last chapter is a critique of the models in view of the general difficulties faced in GDP estimation.

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[1] Hanna, Mazen. Ministry of Finance. Personal interview. June. 1997

1.1. Economic growth

Economic growth is defined as the increase in the total output of a country measured by the change in national income. The importance of this concept lies in its ability to generate not only wealth and happiness, but more importantly, freedom of choice. It gives humans a wider range of social and economic opportunities by expanding the potential output of the economy. Nevertheless, this change could also have a negative effect on traditional social norms.

Individuality that increases with the conviction that market conditions will gradually insure social benefits can harm the traditional "family" social structure. Similarly, economies of scale used in big factories and institutions, become materialistic, damaging to the "human" aspect of a job (like autonomy, decision-making, a separation from ownership of the job and others). Further, it is important to note that growth might lead to income inequality because only the rich can save and invest and would eventually benefit from the economic growth brought from this investment while the poor have to spend all their money on daily life consumption.[2]

1.1.1. Causes

The main components behind the formation of economic growth are capital accumulation, growth in population and technological advancement. By saving income

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[2] Todaro, Micheal. <u>Economics For A Developing World.</u> 3rd ed. New York: Longman, 1992. 111-3

and reinvesting it to increase future output, capital would be augmented. This investment can be in machinery, factories, equipment or any item that can add to the net real value of all physically productive capital goods, increasing directly production. Nevertheless, capital accumulation suggests a trade-off between today's spending and giving up for a better tomorrow.

Similarly, the expansion of the population would develop not only the domestic markets but also the labor force, which in is an increase in productive inputs. If this growth is well incorporated into the economic system, productively used, this would have a positive impact on output in the long run.

Technological advancement is another cause for economic growth. It can be a neutral technological advancement that increases production with the available inputs. On the other hand, it can be a labor-saving or capital-saving progress, meaning it will reduce the use of labor or capital and increase production. Both cases will generate economic growth.[3]

1.1.2. Measuring economic growth

Not only the variation in GDP or GNP can measure economic growth, but the factors causing this rise in national income could also be used. Created in the 1940s by R. Harrod and E. Domar, the Harrod-Domar is the simplest function that can explain

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[3] Ibid. 116 - 20

growth. It is assumed that, to produce any output whether it is under a microeconomic or a macroeconomic environment, the most influencing factor is capital.[4]

Therefore, $Y=K/k$ where Y= national output, K= the stock of capital and, k = the capital-output ratio which is assumed to be a constant. This ratio determines the relation between a nation's stock of capital and its output. The capital output ratio calculates the effect of capital productivity in investment on output. When computing the outcome of an increase in the stock of capital on the total output, this ratio becomes the Incremental Capital Output Ratio (ICOR). The ICOR measures the average relative share of investment out of total output with respect to the change in total output (growth). For instance, if a $2000 investment in equipment increases output by $1000, the ICOR ratio is 2:1.[5]

To measure the increase in output, the previously mentioned function would be derived to become $\Delta Y = \Delta K/k$ and consequently, k becomes the ICOR ratio instead of the capital-output ratio. Growth is defined as the rate of change in national income ($\Delta Y/Y$). Therefore, translating our last equation into a growth equation by dividing both sides with Y, it will become : $\Delta Y/Y = (\Delta K/Y)(1/k)$

In fact, the change in capital in any economy is equal to investment, which, must equal savings. This change should be equal to the national savings rate out of total output.

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[4]Gillis, M. , Perkins, D. , Roemer, M. , and Snodgrass, D. , Economics of Development. 3rd. ed. New York: W. W. Norton, 1992. 43

[5]Ibid.

Therefore, ΔK/Y can be translated into the rate of saving of the economy and the equation would become g = s/k which is the basic Harrod-Domar equation.

Analyzing this final relation, it is deduced that it is from capital accumulation (investment), resulting from people's rate of savings and corporations' investments, that growth is created. So, growth can be calculated by finding the saving rate and the ICOR of a nation.

A different form of production function introduced by R. Solow and E. Denison can also explain the sources of growth. Under this function more factors of production are introduced. $Y = f(K, L, R, A)$

Output is a function of the stock of capital (K), the size of the labor force (L), the stock of land and natural sources (R) and the increases in the productivity or efficiency with which inputs are used.

Deriving this equation, a growth function is obtained $g_Y = a + W_K g_K + W_L g_L + W_R g_R$ In this equation, "a" is a variable measuring the shift in the production function due to increases in efficiency and productivity. While W_K, W_L, and W_R are the weights of each of the above mentioned factors of production's growth.[6]

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[6] Ibid.44-9.

Analyzing the sources of growth under this model, it was concluded that productivity and efficiency in production constitute the most important growth engines. Nevertheless, capital still has a great effect on growth especially in developing countries. Actually, productivity and efficiency that result from technological progress are mainly incorporated in the production of capital equipment. However, this does not mean that the accumulation of capital and the productivity of factors of production are the only sources of growth. Increasing labor force and developing its skills are also as important.[7]

1.2. National income

National income is the value of the country's productive activity. Different explanations can fit this definition, yet the most widely used is the gross national product (GNP) or the gross domestic product (GDP). This is an unduplicated value of the national production in the sense that it includes all the final products in the economy but excludes the value of any intermediate product (i.e. products used in the production of other products). It is computed by estimating the value-added of each sector, which is the value of the addition at each phase of production. This measure incorporates all the economic activity of the country and avoids the study of individual products which might be misleading as time goes by and difficult to implement.

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[7] Ibid.

While the GNP is the value of the total production activity of the citizens of the nation, the GDP accounts for the products of all the activity held within the borders of the country.[8]

1.2.1. The flow of income

The economy necessarily consists of only five agents: entrepreneurs, firms, government, households and the rest of the world. It is also formed of three markets, the goods and services market, the factors of production market and the financial market.

Households provide firms with labor, land, and capital from the factor market. In return, these pay wages for labor, interest for capital, rent for land, and profit for entrepreneurs. The households earned income is national income. On the other hand, companies sell households products and services like consumer products and other products in the real sector market. This income, received from households for such products, is the consumption expenditure. Further, the firms buy capital from financial markets by borrowing from households. Consequently, this latter group would be investing in capital equipment for firms. Similarly, government being an agent in the economy buys goods and services from the firms in the real sector. To pay, this latter uses taxes and all other sorts of government receipts. In case these are not sufficient, the government will have a deficit and would need to borrow. Nevertheless, this flow from borrowing would not be included in the calculation of national income just like the

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[8]Eatwell, J. , Muzzay, and M., Newman, P. The New Palgrave: A Dictionary of Economics . vol.3. London: The Macmillan, 1982. 591.

borrowing of the firms is not considered. Instead, the flow of income resulting from the spending of these loans on productive items is taken into account. The rest of the world should be included by adding exports to domestic product accounting and subtracting imports.[9]

1.2.2. Measuring national income

GDP or GNP can be calculated in two ways either by what buyers pay for, or by what producers' cost to create a good. These two methods should balance. The income paid by the buyers for their goods and services is the aggregate expenditures approach "expenditures side" while the payments of the producers for inputs or factors of production is called the factor income approach or the "earnings side". It is important to note that the essence in calculating national income is adding all income used for the production of goods and services, excluding, that which is not used for this purpose.

According to the "expenditures side" approach (what buyers pay for) both GNP and GDP, are calculated by summing all goods and services that enter into final demand. These would include spending by the public and private sector on "capital formation" (capital goods plus changes in inventory stocks), private consumption expenditure (food, clothing, entertainment and so on) and public consumption (government expenditure on schools, hospitals, defense, etc.). In addition, exports are also included because the population of the economy produces these though they are not used by it.

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[9]Parkin, Micheal. <u>Macroeconomics.</u> 3rd ed. USA: Addison-Wesley, 1996. 130-4.

Similarly, imports are subtracted because though they are used by the society, they were not produced by this society and represent a claim to other countries.

However, expenditure on inputs or intermediate products are not accounted for because these would be double counted when calculating the expenditures of final products. Likewise, calculated as final goods when they were first produced, it becomes unessential to take into account used goods. Spending on financial assets is not included because it is calculated when including capital formation.

The other approach, the "earnings side" or factor income approach measures what firms pay to households for their services as factors of production. These are mainly five sources of income. First, the wages and compensation for labor is what all workers receive in income including taxes and all benefits. Second, net interest is what the households get in interest on loans made by them net of the interest they pay on credits. Third, the rental income is the rent paid on all fixed assets like land, houses, buildings, etc. including the imputed rent that any owner would have had to pay for, had he/she not owned that asset. Fourth, corporate profits should be added whether paid as dividends or retained as earnings because they constitute an income of one of the agents; the firms. Fifth, proprietor's income, a mixture of the above-mentioned items, is also accounted for.

Though both methods can be used to calculate GDP or GNP, the difference between the earnings and the expenditure approach is that the first is evaluated at cost while the second is considered at market prices. The "earnings side" approach does not consider

indirect taxes and subsidies, while these are included in the market prices under the expenditure approach. Thus, taxes should be added while subsidies subtracted when using the factor income approach. In addition, though the expenditures side accounts for capital formation including depreciation on these investments, the item reflecting this spending under the "earnings side" approach is the profit of firms account which excludes depreciation. Hence, the latter approach should include depreciation to balance the expenditure method. If depreciation is excluded, the resulting sum would be called the net national product or net domestic product (GNP minus depreciation or GDP minus depreciation).

GDP can be estimated or valued as the contribution of each industry to national income. It can also be calculated by finding the value-added in each industry producing output.[10] In other words, it is what the firm adds to the value of the intermediate goods used in forming a final product (the firm's production minus the value of intermediate goods). Correspondingly, this would be the value of income paid to factors of production used in producing the output. Having two approaches to use to reach the same result, and since the amount of data needed is enormous and can not be obtained easily, several countries use both approaches to check one approach's results against that of the other and consequently, set off any possible discrepancies.

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[10]Ibid.134-40.

1.2.3. Historical estimates of GDP in Lebanon

The inadequate and insufficient planning and implementation, the institutional flaws, the incompetence of the civil service and the corrupt political system, have all contributed to an economic failure in various developing countries like Lebanon. The Lebanese economy has always been unstable, not only because of the destructive war but also due to the lack of development planning during pre-war years, though this period had witnessed stable economic growth.

The most important yardstick of the economy; GDP, was never accurately estimated. Dr. Albert Badre created the first macroeconomic model in Lebanon.[11] By segmenting the economy into different sectors (agriculture, industry, and services), the model calculated the net national product (GNP minus depreciation) NNP for the years 1950 to 1957. Later on the Ministry of Finance measured the NNP until 1964.[12]

As the Central Directorate for Statistics was established, an official entity responsible for estimating GDP and NNP, statistics were available for the years 1964 to 1973. After this period and as the war started, official national aggregates were no more available. [13]

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[11] Debs, K., Sleiman, O. and Tayah, J. Major Economic Indicators Lebanon 1951-1992 1st ed. Lebanon: n.p. , n.d. 2-3.
[12] Ibid.

[13] Ibid.

CHAPTER TWO

THE CENTRAL STATISTICS DEPARTMENT APPROACH

Since 1972, after the disruption of the operations of the Central Directorate For

Statistics, no official national accounts were published. Later on, in 1979 the

government created a new statistics department; The Central Statistics Department

(CSD) to replace the old one and to start operating in 1994. Collecting information as

the official entity, the CSD conducted surveys and published different statistics.

However, due to the difficulties faced in obtaining relevant information, it was only able

to calculate the national income of the country for the years 1994 and 1995.

2.1. Input-output models

An input-output model is a detailed study on each industry. To forecast and plan the

direction and structure of the economy, analysts use input-output model (also called

inter-industry models). It is a matrix that shows the flow of products in the different

industries of the economy. Output is divided between intermediate products if it is used

in the manufacturing of other goods, and final products if it is consumed, invested or

exported. The matrix is formed from input columns for the intermediary products used

as the resources in other industries and output rows according to the output produced by

each industry and used either as intermediary products or final products. Products are

allocated according to their usage. In addition to the input used in every activity, the value added in each industry is included.

This approach is based on the identity between the uses of outputs and sources of inputs. GNP or GDP would be calculated on both sides using the total value added of the resources in each industry or the final usage of products in each industry.[14]

2.2. The CSD input-output model

The CSD used the ideal method to calculate GDP by using the "earnings side" approach or the value-added of each sector from one side, and the "expenditure side" or final product approach from the other side. The statistics were fit into an input-output, inter-industry model according to the flow of income, but by industries forming this economy and not according to the agents in the economy.

2.2.1. The parameters

The main parameters determined by this model are the national accounts: public and private consumption, public and private investment, exports and imports and GDP. These were divided according to the resources and uses of the goods and services domestically produced in each sector of the economy, divided into fourteen different industries: agriculture, livestock, water and energy, agro-industries, textiles, non-

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[14] Peterson, C. and Lewis, C. Managerial Economics. 3ʳᵈ. New York: Mcmillan, 1994. 155-60.

metallic mineral products, metals and machinery, wood and chemical products, furniture, construction, transport and communication, services, trade and other industries designated as others.[15]

2.2.2. The hypothesis

The CSD resorted to the basic definition of GDP. Domestic output is the sum of all value added by sector. Nevertheless, the CSD was unable to conduct surveys on a sample to calculate the value added within each sector. Instead, it relied on information and statistics available at official sources to find out how the income was flowing from one industry to the other. Then, using some logical inference, opinion polling, field observations in addition to some indicators, the value added within each sector was determined.

In the agricultural sector, industries and other services sectors, the CSD resorted to available information from different ministries in addition to the imported and exported goods. In fact, it classified these items according to their usage in each sector and sub-sector and accordingly it was able to differentiate between the intermediary items that would create value added, and final goods and services. To validate the obtained information the CSD made sure that equilibrium exists when using two different references. However, agricultural information is still unreliable and needs to be confirmed using agricultural surveys.[16]

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[15]Report on the National Accounts 1994-1995. Statistical Reports Series 5. Central Statistics Department. Beirut: 1997. 8.
[16] Ibid.

The results of the data on value added in the industrial sector in 1994 is assumed to be accurate because it is based on a survey conducted by the ministry of industry in collaboration with a German party. In 1995, the sector was valued by studying the imports of primary products used in local manufacturing and then inferring the volume that can be produced from these elementary items.

The construction sector was also determined by using a coefficient that relates the final construction product to the inputs used in this operation. This was reinforced by opinion polling of different contractors.[17]

Transport was estimated from the value added of passengers' transport and not freight. This latter was included in other sectors that made use of this service. Trade was evaluated by estimating profit margins from field observations and from the available information at the Ministry of Economy. Value added from residency was calculated using the information on collected rent in a study conducted by the Ministry of Social Affairs and the UNDP.

Information on other services including car and house equipment maintenance, hotels, restaurants, health, education, and financial services were also obtained from different sources, and using logical and indirect reasoning the value added was computed. Other non-financial services were not included due to lack of information on these sectors.[18]

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[17] Ibid.
[18] Ibid. 7-9

Imports and exports were obtained from the High Customs Council yet the figures were adjusted to maintain a balance between local production and exports while profit margins resulting from re-export operations and net foreign freight payment were considered as part of exports.

On the other side, after using the factor income approach by computing the value-added of the economy's sectors, different assumptions were used to calculate domestic spending applying the aggregate expenditure approach.

Consumption spending was determined from households or residents purchases of goods and services in addition to the purchases of the public sector and the salaries of this latter's employees. Again here the Ministries were the main source providing information on their purchases and salaries of the employees while no survey was conducted to estimate households consumption. Consequently, this account was approximated from the available produced goods for final usage of households that were sold.

Investment spending was computed from spending on machinery and equipment by the public sector and by the private manufacturing companies, in addition to the value of all construction and public work done through the year excluding spending on weapons by the Ministry of Civil Defense. Again the public investment was determined from the governments work in rehabilitating the country including the Council of Development

and Reconstruction work. The private investment was implied from imports of all machinery for final uses and from the erections completed in that year.[19]

2.2.3. The functional relationship

After assembling all the intermediary goods and services used for production creating value added within each sector, the remaining of these goods and services must be "final-usage" goods or services. Thus, the functional relationship used to compute all national aggregates using the above mentioned data is the identity between the domestic products (measured using a value added approach) with imports less exports from one side, and the spending on the final usage of these available domestic products. Tables 2.1 and 2.2 illustrate also the balance between uses and resources applied to calculate domestic production. The spending on consumption and investment comes from the resources of the economy, which are GDP and net imports. Nevertheless, the functional relationship equating the "earnings-side" accounting method with the "spending-side" method can give an idea not only about GDP and its components but also about the sectoral structure of the economy.

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[19]Gaspardian, Robert, Chairman and General Manager Central Statistics Department.Personal interview. February, 1998.

Table 2.1 1994 Input -Output matrix in LBP billions

| | Intermediary products by the different industries | | | | | | | | | | | | | | | | Final goods | | | |
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Others	Total	Consumption	Investment	Export	Total ressources
1.Agriculture	57	74		663	2				1	1	4		5			808	2,898		196	3,902
2.Livestock		242		4	4					2						252	822	1	12	1,087
3.Energy & water	10		220	50	20	44	35	19	19	7	14	268	108	7		821	579		8	1,408
4.Agro-industry		49		244												294	3,133		92	3,519
5.Textiles	2				416			1	15	1						440	1,680	8	154	2,282
6.Non metallic minerals	1			28	1	307	5	17	4	5	964		2	3	3	1,337	182	5	58	1,582
7.Metal & equipment				42	1	19	510	2	64	23	1,032		2	3		1,959	1,938	1,445	203	5,545
8.Wood & chemical products	111			13	15	20	3	295	210	155	196		257	7	1	1,333	934	93	117	2,477
9.Furniture										18			81	204	30		713	54	12	779
10.Others													10	62	8	99	511	142	201	953
11.Construction																		3,711		3,711
12.Transport & communication													25	30	4	59	599		69	727
13. Services	10		1	18	12	19	15	12		5	84	41	112	472		802	2,972			3,774
14. Trade																			144	144
Total input	192	368	221	1,062	472	409	568	347	313	217	2,294	309	600	788	46	8,204	16,962	5,457	1,265	31,890
Value-added	1,560	247	27	501	381	557	434	345	266	147	1,417	417	3,182	4,314	(46)	13,749				
Production	1,750	615	248	1,563	853	966	1,002	692	579	364	3,711	726	3,782	5,102		21,953				
Imports	744	241	855	1,104	910	462	3,687	1,411	90	432						9,936				
Profit margin	1,408	231	304	854	519	152	856	374	101	159					(4,958)					
Total ressources	3,902	1,087	1,407	3,521	2,282	1,580	5,545	2,477	770	955	3,711	726	3,782	5,102	(4,958)	31,889				

Source: Report on the National Accounts 1994-1995. Statistical Reports Series 5. Central Statistics Department. Beirut: 1997. 8.

Table 2.2 1995 Input -Output matrix in LBP billions

| | Intermediary products by the different industries | | | | | | | | | | | | | | | | Final goods | | | |
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Others	Total	Consumption	Investment	Export	Total ressources
1.Agriculture	73	65		787	2					1	5		6			942	3,454		340	4,736
2.Livestock		212		4	4					4					1	224	742	1	11	978
3.Energy & water	13		244	59	20	52	44	21	21	11	16	328	126	3		959	689			1,648
4.Agro-industry		43		290												333	3,603		101	4,037
5.Textiles	2				414			1	16	1						435	1,760	6	177	2,378
6.Non metallic minerals	1			33	1	361	6	19	4	8	1,132				1	1,567	216	6	71	1,860
7.Metal & equipment				50	1	23	630	2	71	37	1,211		2	15		2,341	2,249	1,750	274	6,614
8.Wood & chemical products	143	1		15	15	24	4	335	232	252	230		300	33		1,375	1,285	96	196	2,952
9.Furniture										29			94	36			817	59		876
10.Others													12			43	713	179	477	699
11.Construction																		4,356		5,069
12.Transport & communication													29	36	32	97	678		114	889
13. Services	13	1	1	21	12	22	22	14	10	8	99	50	29	450	175	1,024	3,383			4,407
14. Trade													130						190	190
Total input	246	322	245	1,259	470	482	706	393	356	351	2,693	378	699	537	208	9,340	19,589	6,453	1,951	37,333
Value-added	2,021	216	30	594	379	656	536	293	238		1,663	510	3,708	5,417	(207)	16,445				
Production	2,267	538	275	1,853	849	1,138	1,242	649	589	597	4,356	888	4,407	5,954	1	25,790				
Imports	759	232	988	1,274	962	541	4,389	1,694	109	597						11,545				
Profit margin	1,709	207	384	910	568	182	985	474	118	227					(5,765)	(1)				
Total ressources	4,735	977	1,647	4,037	2,379	1,861	6,616	2,952	876	1,413	4,356	888	4,407	5,954	189	37,334				

Source: Report on the National Accounts 1994-1995. Statistical Reports Series 5. Central Statistics Department. Beirut: 1997. 8.

2.3. The output

The output was represented in an inter-industry matrix showing the relation between the different industries and classifying products into intermediary and final commodities (Table 2.1 and 2.2). The balance between supply and demand or aggregate spending and resources is illustrated in Table 2.3 according to the sectoral data obtained for the calculation of GDP. It is important to note that resources are composed of local production (the output of companies) valued at ex-factory prices and (Cost Insurance and Freight) prices for imports, in addition to profit margins.

Output is utilized either as an intermediary product for other industries or as final usage product. Accordingly, the CSD divided intermediary products into different branches in agreement with their application. Final products were divided into goods for consumption, for capital accumulation (investment) or for export (Table 2.1, 2.2 and 2.3).

The input-output model is not only used to calculate GDP but it can offer a deeper insight on the resources and output of each sector. This approach is used as a tool to plan a GDP targeted growth according to the growth rate on in each sector of the economy and its effect on other sectors using the coefficients of inter-industry inputs.

Table 2.3 National accounts 1994-1995

In LBP billions	1964	1977	1994	1995
Domestic spending				
Consumption	**3.165**	**9.225**	**18,205**	**20,921**
Public sector purchases	*0.065*	*0.641*	*343*	*434*
Public sector employees salaries	*0.231*	*0.629*	*1,244*	*1,334*
Households purchases	*2.856*	*7.120*	*16,618*	*19,153*
Investment	**0.705**	**1.718**	**5,457**	**6,454**
Public sector machinery	*0,010*	*na*	*81*	*124*
Public sector erections	*0,124*	*na*	*540*	*868*
Private sector machinery	*0,236*	*na*	*1,665*	*1,974*
Private sector erections	*0,335*	*na*	*3,171*	*3,488*
Total domestic spending	**3.870**	**10.943**	**23,662**	**27,375**
Resources of goods & services				
GDP	**3.200**	**8.200**	**14,992**	**17,779**
Value added				
Agriculture & livestock	*0.381*	*0.700*	*1,807*	*2,237*
Water, energy, and industry	*0.480*	*1.515*	*2,657*	*3,118*
Construction	*0.178*	*0.280*	*1,417*	*1,663*
Transport & communication	*0.258*	*0.630*	*417*	*510*
Trade	*1.028*	*2.320*	*4,314*	*5,413*
Housing	*0.250*	*0.730*	*670*	*752*
Services	*0.380*	*1.190*	*2,512*	*2,956*
Public administration	*0.245*	*0.835*	*1,244*	*1,334*
Adjustment			*-46*	*-207*
Imports	**1.289**	**4.223**	**9,936**	**11,545**
-Exports	**-0.619**	**-1.480**	**-1,266**	**-1,949**
Total resources of goods & services	**3.870**	**10.943**	**23,662**	**27,375**

Source: Report on the National Accounts 1994-1995. Central Statistics Department 1997

The value of agricultural products in 1994 reached LBP 3,902 billion of which 45% from domestic production, 19% from imports and the remaining is the profit margin. In parallel, the 1995 figures increased to LBP 4,735 billion with the first component increasing to 46% at the expense of imports. Tables 2.4 and 2.5 will show the different coefficient of production for 1994 and 1995. A closer look would show that, for example, if wood and chemical production is increased by LBP 100 billion worth of commodities, LBP 50 billion will be generated from the work in this sector while the other LBP 50 billion will come from an increase in the production of sectors like metallic and non metallic products, energy and water, transport and services activities.

This growth in these sectors will in turn create a demand for other products from other industries creating a "snow ball"-effect, initiating growth.[20]

It is also important to note that in both years 69% of the economy's resources were locally produced while 31% came from imports. Construction, with 57% value added against 43% of inputs in this sector, is clearly totally locally produced and will consequently, contribute to capital formation. On the other hand, industrial products witness a lot of inter industry consumption. For instance, around 70% of the wood industry products is used in the furniture industry. Expenditures on final products considered as investment comes partly from construction (68%) and from metal equipment (approximately 27%). Consumption spending is mainly on food items and services while the bulk of exports are from agricultural items and other products (Table 2.4 and 2.5).[21]

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[20] Report on the National Accounts 1994-1995. Statistical Reports Series 5. Central Statistics Department. Beirut: 1997. 16-18.
[21] Ibid.20.

Table 2.4 *1994 Coefficient Input-Output matrix for the year 1994*

	Intermediary products by the different industries																	Final goods			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Others	Total	Consumption	Investment	Export	Total ressources
1.Agriculture	30%	20%		62%									1%			10%	17%		15%	12%
2.Livestock		66%			1%					1%						3%	5%		1%	3%
3.Energy & water	5%		100%	5%	4%	11%	6%	5%	6%	3%	1%		18%	1%		10%	3%		1%	4%
4.Agro-industry		13%		23%								87%		1%		4%	18%		7%	11%
5.Textiles	1%				88%				5%						7%	5%	10%		12%	7%
6.Non metallic minerals	1%			3%		75%	1%	5%	1%	2%	42%					16%	1%		5%	5%
7.Metal & equipment				4%		5%	90%	1%	20%	11%	45%		43%	1%	2%	24%	11%	26%	16%	17%
8.Wood & chemical products	58%			1%	3%	5%	1%	85%	67%	71%	9%		14%	26%	65%	16%	6%	2%	9%	8%
9.Furniture																	4%	1%	1%	2%
10.Others													2%			1%	3%	3%	16%	3%
11.Construction										8%			2%	8%	17%		0%	68%		12%
12.Transport & communication													4%	4%	9%	1%	4%		5%	2%
13.Services	5%			2%	3%	5%	3%	3%		2%	4%	13%	4%	4%	9%	10%	18%		11%	12%
14. Trade													19%	60%						
Total input	11%	60%	89%	68%	55%	42%	57%	50%	54%	60%	62%	43%	16%	15%		37%	100%	100%	100%	100%
Value-added	89%	40%	11%	32%	45%	58%	43%	50%	46%	40%	38%	57%	84%	85%		63%				
Production	45%	57%	18%	44%	37%	61%	18%	28%	75%	38%	100%	100%	100%	100%		69%				
Imports	19%	22%	61%	31%	40%	29%	66%	57%	12%	45%						31%				
Profit margin	36%	21%	22%	24%	23%	10%	15%	15%	13%	17%					100%					
Total ressources	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%				

Source: *Report on the National Accounts 1994-1995. Statistical Reports Series 5. Central Statistics Department. Beirut: 1997. 8.*

Table 2.5 *1995 Coefficient Input-Output matrix*

	Intermediary products by the different industries																	Final goods			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Others	Total	Consumption	Investment	Export	Total ressources
1.Agriculture	30%	20%		63%									1%			10%	18%		17%	13%
2.Livestock		66%			1%					1%						2%	4%		1%	3%
3.Energy & water	5%		100%	5%	4%	11%	6%	5%	6%	3%	1%		18%	1%		10%	4%			4%
4.Agro-industry		13%		23%								87%		1%		4%	18%		5%	11%
5.Textiles	1%				88%	75%			4%							5%	9%		9%	6%
6.Non metallic minerals	1%			3%		75%	1%	5%	1%	2%	42%					17%	1%		4%	5%
7.Metal & equipment				4%		5%	89%	1%	20%	11%	45%		43%	3%		25%	11%	27%	14%	18%
8.Wood & chemical products	58%			1%	3%	5%	1%	85%	65%	72%	9%		13%	6%		15%	7%	1%	10%	8%
9.Furniture																	7%	1%		2%
10.Others													2%				4%	3%	24%	2%
11.Construction										8%			4%	7%	15%	1%		68%		14%
12.Transport & communication													4%	7%	84%	1%	3%		6%	2%
13.Services	5%			2%	3%	5%	3%	4%	3%	2%	4%	13%	19%	84%		11%	17%		10%	12%
14. Trade																				1%
Total input	11%	60%	89%	68%	55%	42%	57%	50%	55%	60%	62%	43%	16%	9%	2080%	36%	100%	100%	100%	100%
Value-added	89%	40%	11%	32%	45%	58%	43%	50%	45%	40%	38%	57%	84%	91%	-2070%	64%				
Production	48%	55%	17%	46%	36%	61%	19%	27%	74%	42%	100%	100%	100%	3150%	100%	69%				
Imports	16%	24%	60%	32%	40%	29%	66%	57%	12%	42%						31%				
Profit margin	36%	21%	23%	23%	24%	10%	15%	16%	13%	16%				-3050%						
Total ressources	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%				

Source: *Report on the National Accounts 1994-1995. Statistical Reports Series 5. Central Statistics Department. Beirut: 1997. 8.*

CHAPTER THREE

THE COUNCIL OF DEVELOPMENT & RECONSTRUCTION APPROACH

The Council for Development and Reconstruction appointed by the government is responsible for the restructuring and the rehabilitation of the different sectors of the economy that were damaged by the war. The CDR in 1992 had a National Emergency Program for the three years 1993-1995 to rehabilitate and develop various sectors of the economy. Later on, this project was adjusted to become the Horizon 2000 plan to estimate longer term requirements and priority needs for investment. Thus, though the CDR is a government-sponsored entity, its objective is not to calculate national accounts, but to formulate some sort of economic framework to rely on when planning the reconstruction, especially that before 1997 no official statistics existed.

3.1 The Horizon 2000 model

Expenditures of this program were expected to be around $17.8 billion in constant 1995 prices. This plan that lasts till 2007 is tailored to fit the various characteristics that distinguish Lebanon. To implement it, a global forecast of the macroeconomic environment was prepared.

3.1.1. The parameters

The Horizon 2000 macroeconomic model is composed of two interrelated modules: the public finance and the national accounts module. The variables used to form the first are mainly the overall budget balance, the domestic and foreign debt, in addition to the inflation and exchange rates. The national accounts module is constituted of the national aggregates (consumption, investment, exports, imports), a growth rate to determine national income and an incremental capital-output ratio (ICOR).

3.2.2. The hypothesis

Though the war destroyed physical capital, and though natural resources are rare, the human capital is assumed to allow for a quick economic recovery. In addition, the financial credibility of the country and the supposition that liquid assets of the Lebanese abroad will flow back to the country, are other factors that were expected to affect the recovery. Furthermore, the private sector is, gradually, expected to play a major role in the recovery of the country, since it has always formed a large share of GDP. The CDR considered a parallel governmental plan that would ensure the necessary fiscal and monetary environment for the recovery. Further to these assumptions, each of the two modules was based on a hypothesis that will determine the economic indicators.[22]

i. The public finance module

Different assumptions are used to build the model and forecast GDP. The first assumption

is an increase in the government's current revenues from 19% in 1995 to 27% of GDP by

2007. These rates were deduced to be acceptable according to the World Bank's

comparison of middle income countries' 1992 current public revenues, including public

enterprises surpluses, as a percentage of GNP and not GDP (Table 3.1). However, since the

GNP is greater than the GDP in Lebanon, the comparison would not be plausible and could

lead to results lower than the compared average level. Therefore, to adjust the ratios, the

CDR assumed that including public enterprises surpluses in public revenues would elevate

the revenue to GDP ratio to approximate the compared standard of revenues to GNP.

Since, a rising international trend is observed, the ratios are assumed to be valid as such.

Nevertheless, it is worth noting that this rate (27%) is close to the upper extreme.[23]

Table 3.1 Comparative data on current government revenues as a percentage of GNP

	1985	1990	1992
Jordan	27.7	22.3	30.0
Singapore	28.7	27.9	28.3
Korea	19.0	15.7	18.2
Thailand	na	na	18.1
Malaysia	na	28.9	30.1
Morocco	na	na	29.5
Tunisia	na	36.6	37.9
Portugal	na	36.6	37.9
Upper middle income countries	23.6	na	na
All middle income countries	22.7	na	na
Industrial economies	24.5	na	na

Source: Horizon 2000 For Reconstruction and Development Main Report 1995

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[23] Ibid. 11-15

A decline in current non-interest expenditures during the reconstruction era from 17.4% of

GDP in 1995 to 15.4% by 2007 with total current expenditures declining from 26% in 1995

to 19% in 2007 is presumed. Total expenditures will remain high at around 40% in the first

three years but will decline to around 20% later on with interest expenditures determined

according to the assumptions used to simulate local and foreign borrowing. Expenditures

ratios were implied from World Bank 1992 statistics where lower and upper middle income

countries had a median total public expenditures out of GNP of 25.5% and 31.5%

respectively. Again, though GNP and not GDP was used, this was considered an adequate

measure since the government is following a heavy recovery program and consequently, the

government revenues per GDP will be high during the first years. Thus, the current budget

balance will move from a 7% deficit in 1995 to a surplus in 1999 rising to 8% in 2007. [24]

The public finance module assumed that the foreign currency financing is preferred as

compared to domestic currency financing to benefit from its favorable terms and to avoid

crowding out, and hence the first will finance 50% of the total public recovery expenditure.

Furthermore, the foreign currency borrowing is restricted to cover 80% of the public

investment expenditures each year and will not finance any current expenditure. Foreign

grants were forecasted at 5% of the funds needed for the program for 1995 to 1997

declining to 0.4% during 1998 and 2002 and 0% later on. As of year 2000, the simulated

budget surplus would provide part (90% after 2003) of the funds needed to finance the

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[24]Ibid. 63-68

recovery program requirements. Add to these a government creditor account that was estimated to be LBP 1500 billion in 1994 by the Ministry of Finance and the Central Bank.[25]

The total debt stock is not supposed to go beyond 92% of GDP (it will reach a peak in 1999). The domestic debt is supposed to cover the current budget deficit, debt repayments and the annual balance of investment expenditures that could not be covered by the foreign borrowing.

The foreign debt is assumed to be associated with a nominal dollar interest rate of 7%, a three year grace period on capital repayments, and a ten year repayment period following the grace period. On the other hand, nominal interest rate on domestic currency borrowing will be consistent with a real rate of return of around 8.5% in 1996 declining to 5% by 1999 and 4% by 2005 according to the Ministry of Finance. The Ministry determined the 1995 interest payments (Table 3.2).

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[25] Ibid.

Table 3.2 Public Finance Forecast 1995-2007

In Current LBP Billion		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Nominal GDP		16,707	19,155	21,811	24,725	27,751	31,158	34,959	39,286	43,698	48,604	54,089	59,615	65,706
Total current expenditures		4296	4708	5267	5929	6461	7198	7963	8761	9534	10164	10973	11701	12414
Total current expenditures as a % of GDP		*26%*	*25%*	*24%*	*24%*	*23%*	*23%*	*23%*	*22%*	*22%*	*21%*	*20%*	*20%*	*19%*
Non-interest expenditures		2900	3298	3722	4175	4633	5142	5715	6354	7000	7706	8488	9256	10091
Non-interest expenditures as % of GDP		*17%*	*17%*	*17%*	*17%*	*17%*	*17%*	*16%*	*16%*	*16%*	*16%*	*16%*	*16%*	*15%*
Total interest payments		1396	1410	1545	1754	1828	2056	2248	2407	2534	2458	2485	2445	2323
Total interest payments as % of GDP		*8%*	*7%*	*7%*	*7%*	*7%*	*7%*	*6%*	*6%*	*6%*	*5%*	*5%*	*4%*	*4%*
Total current revenues		3151	3773	4517	5380	6403	7533	8877	10083	11455	12854	14432	16044	17839
Total current revenues as % of GDP		*19%*	*20%*	*21%*	*22%*	*23%*	*24%*	*25%*	*26%*	*26%*	*26%*	*27%*	*27%*	*27%*
Tax receipts		1667	2012	2452	2979	3591	4250	5057	5765	6584	7427	8383	9378	10499
Tax as % of GDP		*10%*	*11%*	*11%*	*12%*	*13%*	*14%*	*14%*	*15%*	*15%*	*15%*	*15%*	*16%*	*16%*
Non tax revenues		1484	1715	1974	2266	2579	2947	3384	3788	4248	4724	5260	5802	6404
Non tax revenues as % of GDP		*9%*	*9%*	*9%*	*9%*	*9%*	*9%*	*10%*	*10%*	*10%*	*10%*	*10%*	*10%*	*10%*
Transfers from public enterprises		0	46	90	135	234	336	435	530	624	703	789	865	936
Transfers from public enterprises as % of GDP		*0%*	*0%*	*0%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*
Current budget balances		-1145	-935	-750	-549	-58	335	914	1322	1921	2690	3459	4343	5425
Current budget balances as % of GDP		*-7%*	*-5%*	*-3%*	*-2%*	*0%*	*1%*	*3%*	*3%*	*4%*	*6%*	*6%*	*7%*	*8%*
Total public investment		2695	2797	2909	2838	2952	2868	2983	2883	2999	2882	2752	2607	2711
Total public investment as % of GDP		*16%*	*15%*	*13%*	*11%*	*11%*	*9%*	*9%*	*7%*	*7%*	*6%*	*5%*	*4%*	*4%*
Overall budget balance		-3840	-3732	-3659	-3387	-3010	-2533	-2069	-1561	-1078	-192	707	1736	2714
Overall budget balance as % of GDP		*-23%*	*-19%*	*-17%*	*-14%*	*-11%*	*-8%*	*-6%*	*-4%*	*-2%*	*0%*	*1%*	*3%*	*4%*
Credit bal.(LL1500 in 95)&foreign grants		1600	166	166	66	0	0	0	0	0	0	0	0	0
Credit bal.(LL1500 in 95)&foreign grants as % of GDP		*10%*	*1%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Overall financing requirements		-2240	-3566	-3493	-3321	-3610	-2533	-2069	-1561	-1078	-192	707	1736	2714
Overall financing requirements as % of GDP		*-13%*	*-19%*	*-16%*	*-13%*	*-13%*	*-8%*	*-6%*	*-4%*	*-3%*	*0%*	*1%*	*3%*	*4%*
Gross foreign borrowing		2156	2237	2327	2271	2361	2294	2069	1561	1077	192	0	0	0
Gross foreign borrowing as % of GDP		*13%*	*12%*	*11%*	*9%*	*9%*	*7%*	*6%*	*4%*	*2%*	*0%*	*0%*	*0%*	*0%*
Foreign debt repayments		209	43	707	45	242	466	699	926	1162	1391	1598	1754	1862
Foreign debt repayments as % of GDP		*1%*	*0%*	*3%*	*0%*	*1%*	*1%*	*2%*	*2%*	*3%*	*3%*	*3%*	*3%*	*3%*
Net foreign borrowing/overall financing requirements		*87%*	*62%*	*46%*	*67%*	*70%*	*72%*	*66%*	*41%*	*-8%*	*-624%*	*226%*	*101%*	*69%*
Net domestic borrowing		294	1372	1873	1096	890	705	699	926	1162	1391	891	17	-851
Net domestic borrowing as % of GDP		*2%*	*7%*	*9%*	*4%*	*3%*	*2%*	*2%*	*2%*	*3%*	*3%*	*2%*	*0%*	*-1%*
net domestic borrowing/overall financing requirements		*13%*	*38%*	*54%*	*33%*	*30%*	*28%*	*34%*	*59%*	*108%*	*724%*	*-126%*	*-1%*	*31%*
Net borrowing		2241	3566	3493	3322	3609	2533	2069	1561	1077	192	707	-1337	-2713
Net borrowing as % of GDP		*13%*	*19%*	*16%*	*13%*	*13%*	*8%*	*6%*	*4%*	*2%*	*0%*	*1%*	*-3%*	*-4%*
Foreign debt stock	1281	3228	5422	7642	9268	11387	13215	14585	15229	15135	13936	12338	10584	8722
Foreign debt stock as % of GDP		*19%*	*28%*	*35%*	*37%*	*41%*	*42%*	*42%*	*39%*	*35%*	*29%*	*23%*	*18%*	*13%*
foreign debt stock/total debt stock		*27%*	*35%*	*37%*	*41%*	*45%*	*47%*	*49%*	*48%*	*46%*	*42%*	*35%*	*33%*	*32%*
Domestic debt stock	5464	8778	10150	12023	13119	14409	14714	15413	16339	17501	18892	19783	19800	18949
Domestic debt stock as % of GDP		*53%*	*53%*	*55%*	*53%*	*50%*	*47%*	*44%*	*42%*	*40%*	*39%*	*37%*	*33%*	*29%*
Domestic debt stock/total debt stock		*73%*	*65%*	*63%*	*59%*	*55%*	*53%*	*51%*	*52%*	*54%*	*58%*	*65%*	*67%*	*68%*
Total Debt Stock		12006	15572	19065	22387	25996	27929	29994	31559	32636	32823	32121	30384	27671
Total Debt Stock as % of GDP		*72%*	*81%*	*87%*	*91%*	*92%*	*90%*	*86%*	*80%*	*75%*	*68%*	*59%*	*51%*	*42%*

Source: Horizon 2000 For Reconstruction and Development Main Report

Domestic inflation is targeted to decrease from 6% in 1995 to 5% in 1996 and 4.5% in 1997. Foreign inflation will remain at 4%. The exchange rate is expected to be stable at LBP 1660 in 1995 and to remain like that.[26]

The population is assumed to increase by an average of 2.2% annually over the Horizon period.

ii. The national accounts module

To calculate the national accounts, the following assumptions were made. The Incremental Capital Output Ratio (ICOR) was considered to be 3.75 for 1995 and 4.00 for 1996. The latter figure was used continuously throughout the Horizon period. From simulations using ICORs, investment was estimated. The export figures were computed by applying a growth rate of 10.0% annually from 1994 to 2004 and 7.5% later on. The IMF implied these rates over the 1992 -1994 period. However, the export value for the year 1994 (US$ 1700 million) was taken from the World Bank statistics though different international sources have different figures (IMF figures are lower than the World Bank's). Imports were assumed to be subdivided into only three items the imported consumption goods, the imported investment goods and the imported intermediate goods.[27]

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[26] Ibid.
[27] Ibid.

Most important of all assumptions, is a basic one used in estimating the growth rate that will consequently affect all national accounts computations. The Horizon 2000 scenario's main objective is to upgrade the Lebanese economy to reach the group of middle income countries by 2004. Accordingly, the growth rate was calculated based on this target, with an average of 7.8% p.a. for 1994 to 2007. From 1994 to 1998, the growth rate is expected to be at 9% annually. From 1998 to 2002, it will become 8% per annum. The following three years will grow at a 7% rate. For the years 1988 to 1990 GDP was obtained from a UNDP study while the following two year's domestic output growth was estimated by the World Bank.[28]

3.1.3. The functional relationship

The used income identity to forecast national accounts is the following: $Y_t + M_t = C_t + I_t + X_t$ where Y_t is the GDP at market prices, I_t is the total real investment, M_t is the total imports of goods and services, C_t is the total real consumption, and X_t is the total real exports of goods and services at time t.

Based on a UNDP study conducted in 1990, whereby 1994 GDP was estimated to be $8500 million (1994 prices). National income is calculated for the Horizon period using the assumed GDP growth rate.

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[28] Ibid. 79-80

This latter was estimated according to a World Bank analysis of other countries with similar

growth rates as that of Lebanon. Upper middle income countries (such as Mexico,

Venezuela, Uruguay, Brazil, Portugal, Korea, Greece and Saudi Arabia) had their per capita

GNP in 1990 around $2400, which is $2700 at 1994 prices (assuming a 1974 to 1994

period deflator rate of around 4.2%). In these countries the GNP per capita was assumed to

increase at 2% annually. The $2,700 would become by 2007 around $3800 in 1994 prices.

Thus, holding the population growth rate constant at 2.2%, the GDP growth rates were

calculated by projecting an approximate GDP per capita of $3,800 by 2004 to meet the

target of reaching, in 2004, the level to be attained by upper middle income countries in

2007. Furthermore, the significant income factor that characterizes the Lebanese economy

would raise the GDP per capita to reach the level of upper middle income countries' GNP

per capita.[29]

As for the total real investment (I), it is calculated using the simulated real GDP growth

rates and various estimates of incremental capital output ratios (ICOR). Investment is

related to national income by this equation: $I_{t-1}=(Y_t-Y_{t-1})ICOR$ which is the Harrod-Domar

equation ($g= s/k$).

Investment is divided into public (I_{pu}) and private investment (I_{pr}). This latter will be

calculated as the balance between total and public investment. The $ 17.8 billion (constant

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[29]Ibid. 61

1995 prices) public investment figures were divided over the Horizon years as shown in

Table 3.3.[30]

Table 3.3 Proposed Horizon 2000 Investment expenditures (constant 1994 US$ millions)

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
	$1561	1558	1558	1462	1462	1365	1365	1269	1269	1173	1077	981	981	17081

Source: Horizon 2000 For Reconstruction and Development Main Report 1995

The imports are divided into imports of consumption goods M_{ct}, imports of investment

goods M_{it} and imports of intermediate goods M_{vt}. Each of these imports categories is

related to consumption, investment and income respectively and as a result import

coefficients determine these relations as such:

$M_{ct} = c_t C_t$ where c_t is the consumption import coefficient and C_t is the consumption at time

t.

$M_{it} = a_t Ipr_t + b_t Ipu_t$ where a_t and b_t are the private and public investment import coefficient

respectively. Ipr_t is the total private investment while Ipu_t is the total public investment.

$M_{vt} = d_t Y_t$ d is an import coefficient for intermediate imports as a proportion of GDP.

To obtain these coefficients a classification of the 1989 to 1992 imports by the World Bank

was used. Imports include not only consumption, investment and intermediate imported

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[30] Horizon 2000 For Reconstruction and Development Macroeconomic Annex. The Republic of Lebanon
Council for Development and Reconstruction. Beirut. October, 1993. 10.

goods, but also services and other goods. However, holding the presumption that imports were constituted of only the first three mentioned items, these other imported goods and services were redistributed on a prorata basis on the three categories; the imported consumption goods, the imported investment goods and the imported intermediate goods, exhibited in Table 3.4.[31]

Table 3.4 Import classification 1986-1992

	1989	1990	1991	1992
Imports (current US$ million)				
Consumption goods	1166	1244	1945	2187
Intermediate goods	658	702	1097	1224
Capital goods	412	440	687	869
Other goods	11	11	18	20
Services	100	100	100	116
Average exchange rate	*496.50*	*701.76*	*928.23*	*1683.00*
Imports (current LBP billion reclassified)				
Consumption goods	608	914	1863	3798
Intermediate goods	343	516	1050	2125
Capital goods	215	323	658	1509
National accounts items (current LBP billion)				
GDP	1199	1753	3995	9499
Consumption	1707	2566	5792	12844
Investment	240	351	799	1872

Source: Horizon 2000 For Reconstruction and Development Macroeconomic Annex 1995

To calculate the import coefficients based on the modified data, the imported consumption goods, the imported investment goods and the imported intermediate goods were divided by total consumption, total investment and GDP respectively. The following table shows the resulting import coefficients (Table 3.5).[32]

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[31] Ibid. 10 and 18.
[32] Ibid. 18.

Table 3.5 Import coefficients 1986-1992

	1989	1990	1991	1992
Imports coefficients based on adjusted on data				
Consumption goods	0.36	0.36	0.32	0.30
Intermediate goods	0.29	0.29	0.26	0.22
Capital goods	0.89	0.92	0.82	0.81

Source: <u>Horizon 2000 For Reconstruction and Development Macroeconomic Annex</u> 1995

From these coefficients for 1989-1992, an estimate of import coefficients was deduced.

The Horizon 2000 consumer goods' coefficient will range between 0.26 and 0.21 through

the years. Intermediate goods will increase from 0.23 to 0.25 for the last eight years.

Public investment coefficient will decline from 0.8 to 0.7, while private investment will

decrease from 0.75 to 0.65 by 2007 (Table 3.5).[33]

Finally, the identity $Y_t + M_t = C_t + I_t + X_t$ can be written as $Y_t + c_t C_t a_t + d_t Y_t + a_t Ipr_t + b_t Ipu_t = C_t + Ipr_t + Ipu_t + X_t$ and would include only consumption as the unidentified variable. By

solving the equation and finding consumption, the model will be built and all variables

forecasted from 1995 to 2007.

3.2. Projected output

The global economic reformation and the increase in private sector's income, which would

consequently increase tax revenues, affect the results of the recovery. The government will

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[33]Ibid. 19

initiate private sector investments since the economic system prevailing is that of a free market considering that crowding out is avoided. Table 3.6 will display these results.

GDP: It reached $ 13.9 billion in 2000 at 1994 prices. The growth rate suggests that real GDP per capita will double from 1994 to 2007 and thus raising Lebanon to the level of upper middle income countries by 2004.

Investment: Total investment out of GDP will be between 30% and 32% up to the year 2001. It will decrease gradually to 26% from 2002 to 2004 and then to 23% till 2007. The private investment should reach a level of 55% of total real investment during 1995-1997 and then become 68% from 1998-2002 and 78% during 2003 to 2007.

Consumption: Consumption growth rate will be less than output growth rate because consumption would be sacrificed for investment purposes. Thus, it will decline from 127% of GDP in 1995, to 120% in 2000 to 116% in 2007.

Exports and imports: Though the exports are assumed to rise at a rate of 10%, the trade deficit will remain at 50% of GDP for the first five years but will decline to less than 40% per GDP by 2005.

The balance of payment: The current account is forecasted to be in a cumulative deficit of around $92 billion (in current prices) but will be offset by capital inflows of around US$ 95

billion (current prices) by the same time to make 29% of GDP offsetting a current account of -24% of GDP.

By 2007, Lebanon would reach the upper middle income countries but would still need around four years to catch with the war losses and reach an output level had the war not taken place. [34]

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[34]Horizon 2000 For Reconstruction and Development Main Report. The Republic of Lebanon Council for Development and Reconstruction. Beirut. October, 1993. 12-13.

Table 3.6 Horizon 2000 national accounts forecast 1995-2007

Basics of CDR simulation
(In constant 1994 US$ millions of prices)

Assumptions	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Real GDP growth rate		9.00%	9.00%	9.00%	9.00%	8.00%	8.00%	8.00%	8.00%	7.00%	7.00%	7.00%	6.00%	6.00%
Domestic GDP deflator (in LP)		1.075	1.133	1.185	1.231	1.278	1.326	1.379	1.434	1.492	1.551	1.614	1.678	1.745
Percentage change of deflator		7.50%	5.40%	4.50%	3.90%	3.80%	3.80%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%
Population growth rate		2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%
Consumer goods coefficient		0.26	0.26	0.25	0.25	0.25	0.23	0.22	0.22	0.22	0.22	0.21	0.21	0.21
Intermediate goods coefficient		0.23	0.23	0.23	0.24	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Public investment coefficient		0.8	0.78	0.76	0.75	0.75	0.74	0.73	0.72	0.71	0.7	0.7	0.7	0.7
Private investment coefficient		0.75	0.7	0.7	0.68	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Exports growth rates as implied by IMF		10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	7.5%	7.5%	7.5%
1994 GDP	8,500													
1994 Exports	1,700													
ICOR		3.75	3.75	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

National Accounts (In constant 1994 US Dollar prices)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
GDP		9,265	10,099	11,008	11,998	12,958	13,995	15,115	16,324	17,466	18,689	19,997	21,197	22,469
Imports		7,654	8,159	8,793	9,150	9,712	10,427	10,979	11,442	12,188	12,978	13,125	13,884	14,693
Total Supply		**16,919**	**18,258**	**19,801**	**21,148**	**22,670**	**24,422**	**26,094**	**27,766**	**29,654**	**31,667**	**33,122**	**35,081**	**37,162**
Consumption		11,922	12,793	13,575	14,819	15,786	16,932	17,945	19,551	20,755	22,024	23,583	24,898	26,291
Total Investment		3,127	3,408	3,963	3,840	4,147	4,478	4,837	4,571	4,891	5,233	4,799	5,087	5,393
Public Investment		1,561	1,558	1,558	1,462	1,462	1,365	1,365	1,269	1,269	1,173	1,077	981	981
Private Investment		1,566	1,850	2,405	2,378	2,685	3,113	3,472	3,302	3,622	4,060	3,722	4,106	4,412
Exports		1,870	2,057	2,263	2,489	2,738	3,012	3,313	3,644	4,009	4,409	4,740	5,096	5,478
Total Demand		**16,919**	**18,258**	**19,801**	**21,148**	**22,670**	**24,422**	**26,094**	**27,766**	**29,654**	**31,667**	**33,122**	**35,081**	**37,162**

National Accounts (In current millions of US$ prices)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
GDP		10,064	11,539	13,139	14,895	16,717	18,770	21,060	23,666	26,324	29,280	32,584	35,912	39,582
Imports		7,960	8,825	9,891	10,685	11,816	13,193	14,448	15,659	17,347	19,210	20,206	22,228	24,464
Total Supply		**18,024**	**20,364**	**23,030**	**25,580**	**28,533**	**31,963**	**35,508**	**39,325**	**43,671**	**48,490**	**52,790**	**58,140**	**64,046**
Consumption		12,828	14,453	16,027	18,176	20,157	22,486	24,784	28,083	31,005	34,217	38,104	41,838	45,946
Total Investment		3,252	3,686	4,458	4,492	5,045	5,667	6,365	6,255	6,961	7,746	7,388	8,145	8,979
Public Investment		1,624	1,685	1,752	1,710	1,778	1,728	1,797	1,737	1,807	1,736	1,658	1570	1633
Private Investment		1,628	2,002	2,705	2,782	3,267	3,939	4,568	4,518	5,154	6,010	5,731	6,575	7,346
Exports		1,945	2,225	2,545	2,912	3,331	3,811	4,359	4,987	5,705	6,527	7,297	8,158	9,121
Total Demand		**18,025**	**20,364**	**23,030**	**25,580**	**28,533**	**31,964**	**35,508**	**39,325**	**43,671**	**48,490**	**52,789**	**58,141**	**64,046**
Population		3.98	4.07	4.16	4.25	4.34	4.44	4.54	4.63	4.74	4.84	4.95	5.06	5.17
GDP per capita		**2,328**	**2,483**	**2,648**	**2,824**	**2,984**	**3,154**	**3,333**	**3,522**	**3,687**	**3,861**	**4,042**	**4,192**	**4,348**

Structure

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
GDP		56%	57%	57%	58%	59%	59%	59%	60%	60%	60%	62%	62%	62%
Imports		44%	43%	43%	42%	41%	41%	41%	40%	40%	40%	38%	38%	38%
Total Supply		**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Consumption		71%	71%	70%	71%	71%	70%	70%	71%	71%	71%	71%	72%	72%
Total Investment		18%	18%	19%	18%	18%	18%	18%	16%	16%	16%	16%	14%	14%
Exports		11%	11%	11%	11%	12%	12%	12%	13%	13%	13%	14%	14%	14%
Total Demand		**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Horizon 2000 For Reconstruction and Development Main Report

CHAPTER FOUR

BANQUE AUDI'S APPROACH

All through the post war years, to be able to operate in an ambiguous economic environment due to the lack of official data, Banque Audi, through its Economic Analysis Unit had to form its own macroeconomic model. A quarterly report published regularly by the Bank provided a macroeconomic and financial analysis of the Lebanese environment. As a result, different national and international institutions adopted Audi's approach in estimating national accounts. Since Audi's technique is more or less a macroeconometric approach, a brief general overview of this methodology will be introduced, to be followed by a particular review of Banque Audi's model.

4.1. Macroeconometric models

Macroeconometric models are basically formed of two types of equations; the stochastic or behavioral equations, and the identities. Identities are defined to be always true and valid while stochastic equations are estimated from historical data. Two sorts of variables are used the endogenous and the exogenous variables. The latter parameters are assumed to be from outside the model and are taken as given, while the endogenous are explained by the model.[35]

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[35] Internet homepage www.fairmodel.yale.econ.edu

Equations should be specified only on the basis of a plausible theory. In particular, a stochastic equation is supposed to be explained logically by the factors that compose it. An error term is also used to incorporate all the variables that were not accounted for but that affect the endogenous variable. The variance of this error measures how much of the endogenous has not been explained yet. Parameters that relate the variables of the equation are to be estimated from historical data.

After building a model, a more important task is to try to understand it by explaining its properties. If the model represents adequately the economy then it is acceptable. By changing the exogenous variables, and looking at different results under different scenarios, a model's properties would be analyzed.

4.2. The Banque Audi model

Banque Audi's model is a set of equations that will result in equilibrium between aggregate supply and aggregate demand based on certain assumptions and parameters. The regular interaction between the goods market and the money market is the basic feature of the approach relying mainly on a set of simultaneous behavioral equations (based on time series) and identities in addition to personal judgment and opinion polling. Starting in 1991, it is updated four times a year.[36]

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[36]Banque Audi sal - Economic Analysis Unit. Unpublished report of national accounts. November, 1997.

4.2.1. The parameters

Since the model is based on the equilibrium between aggregate supply and demand, the main parameters that should be estimated are the main constituents of GDP: Consumption, investment, and net exports. The exogenous national accounts are the State's accounts, private investment, exports, official transfers (i.e. transfers from government's borrowing and grants), Treasury bills of the public and banking accounts. On the other hand, the endogenous accounts are GDP, aggregate consumption, imports, capital flows and an adjustment variable.[37]

4.2.2. The hypothesis

To calculate GDP, the expenditures side will be used. Private consumption expenditures on goods and services (C_{pr}), gross private domestic investment (I_{pr}), government expenditures on goods and services which is the total of the public sector's consumption expenditures and capital spending ($G = C_{pu} + I_{pu}$), and net exports which is exports minus imports ($X-M$) will be all added to form nominal GDP. To obtain the real GDP from nominal GDP, a price deflator will be needed. A price index in US$ is obtained from the cost of living index formed by an independent organization the "Etude et Consultation Economique sarl" (ECE). The purpose of the model is to

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[37] Ibid.

balance the uses and resources of income of the different agents constituting the economy (households, government and firms).

All fiscal and monetary information is obtained from official sources. In fact, debt service and official transfers are obtained from the Ministry of Finance or using an estimate of interest paid on Treasury bills according to the weekly Treasury bills database. Similarly public sectors wages and salaries are available at the Ministry of Finance or from the annual public budget. From the same sources, public investment is provided in addition to an average of CDR projects in progress. Any additional public consumption obtained from the Ministry of Finance will be included in the government's flow of income.

The basic assumption underlying the model is that the resources and uses of income will balance. Thus, the flow of income by agent will be determined either from the "expenditure side" or the "earnings side" depending on the availability of information.

Households' uses of funds are determined endogenously according to a time series in a linear equation. On the other hand, the firms' resources are implied from the banking sector assuming a fixed autofinancing rate. Bank accounts can be easily obtained from banks because these institutions are fully transparent.[38]

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[38] Ibid.

Perceived direct and indirect taxes are equal to the State's total public receipts as provided by the Ministry of Finance. The public expenditures are adjusted to take into consideration off-budgetary reconstruction expenditures financed by foreign grants or loans. Further, some modifications were needed to maintain the equality between the uses and resources of the government funds.

4.2.3. The functional relationship

The GDP is related to aggregate spending accounts using the basic identity:

GDP=C+I+X-M.

In fact, consumption is divided into public (C_{pu}) and private consumption (C_{pr}). Similarly investment is divided into public investment (I_{pu}) and private investment (I_{pr}).

The public consumption (C_{pu}) as previously mentioned is obtained from the current expenditures of the government as stated or budgeted by the Ministry of Finance including the public sector employees salaries and the debt service paid by the government. On the other hand, the private consumption (C_{pr}) is derived from the consumption behavioral equation of households, which is a regression equation derived from a historical time series.

Though the private consumption function was not fully disclosed, it was confirmed that it is a linear function of the form $C_{pr} = C_{pr0} + MPC *(DY)$. C_{pr0} is the autonomous

consumption, MPC is the marginal propensity to consume while DY is disposable income. Autonomous consumption is adjusted for inflation. [39]

Disposable income (DY) is an estimation of all available figures on inflows and outflows of income.

Public investment (I_{pu}) is also derived from an estimation of public investment spending category and an average progress of CDR reconstruction project.

As for private investment (I_{pr}), it is the result of an equation relating this account to the previous period's private investment adjusted for the variations in the construction sector activity as reflected by different indicators like cement deliveries, construction permits, and the construction cost index.[40]

A multiplier is applied to the official exports released by the High Customs Council are adjusted because they are assumed to be undervalued. Imports are obtained using a marginal propensity to import with total income.

By adding all the previously mentioned equations, GDP is obtained. Accordingly, real GDP growth will be equal to $GDP_t/P_t - GDP_{t-1}/P_{t-1}$ where P_t is the price index.[41]

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[39] Ibid.
[40] Ibid.

[41] Ibid.

4.3. The output

The result of the model will form the aggregate demand and supply in the economy.

From one side, GDP with imports less exports constitutes the supply of income while

total private and public consumption and investment will determine the demand side

balancing the supply. A GDP of US$ 15.19 billion with a growth rate of 3.6% (Table

4.1) is estimated using Audi's model.

Table 4.1 Banque Audi's macroeconomic aggregates

	1997 (in billions LBP)	1997 (in millions $US)	1996 (in millions $US)	Growth 1997
GDP	23,396	15,198	13,946	3.60%
Imports	11,674	7,583	7,109	1.41%
- Exports	-1,400	-909	-1,458	-40.70%
Total Supply	**33,670**	**21,872**	**19,596**	**6.10%**
Private consumption	18,197	11,820	10,945	2.67%
Private investment	6,217	4,039	4,018	-4.44%
Public investment	1,413	918	895	-2.50%
Public consumption	7,843	5,095	3,739	29.53%
Total Demand	**33,670**	**21,872**	**19,596**	**6.10%**

Source: Banque Audi's Economic Analysis Unit- 1997

The same model used for the previous years showed a GDP growth rate of 8.8% in

1994, 7.4% in 1995, and 4.7% in 1996. The structure of supply and demand remained

the same for the last four years. In fact, 1997 total consumption was divided into 69.9%

of private consumption, and 30.1% public consumption, while private investment

constituted 81.5% of total investment and the remaining was left to public investment.

National income supplies 69.5% of total demand against 34.7% from imports.

4.4. Forecasts

The expected growth rate for 1998 is expected to be around 3.0%. This projection was based on forecasts of the model's exogenous variables, in particular the State's accounts, private investment, exports, banking accounts, eurobonds and Treasury bills of the public. The sources of these forecasts are mainly the approved budget of 1998 and the personal opinion of analysts relative to the market conditions, political environment and economic and financial situation. Thus, the exogenous parameters of the model mainly private investment were estimated according to the personal judgment and opinion polling of the analysts.[42]

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[42]Ibid.

CHAPTER FIVE

ECONOMIC BAROMETERS

With the lack of sufficient official information to calculate GDP, the Central Bank opted for an approach to estimate growth using a barometric technique; a composite index of coincident indicators. This section will not only describe the Central Bank's approach but will provide a closer look on Banque Audi's sectoral index.

5.1. Barometric indicators

When two series increase and/or decrease together and are hence, correlated, they are assumed to be coincident. If one varies and the other varies in the same direction regularly but at a later time, the first would be the leading indicator of the latter while the second would be the lagging indicator of the first.

Indicators are helpful in measuring variables, yet are not accurate. Though changes are detected, barometric forecasting remains a qualitative and not a quantitative measure. As for the cost and time needed to find indicator variables, these must be affordable. Otherwise, it would not be worthy to use such a tool. They must be accurate and highly

correlated to the series to be measured. However, fluctuations could distort data. Consequently, grouping these indicators into one index, these distortions can be offset.

Two sorts of indices are used; the composite and the diffusion indices. The composite index is a weighted index of different indicators. Weights are allocated according to the degree of correlation of the indicators with the variable to be measured. Accordingly, larger weights are applied to the indicator with the highest degree of correlation. On the other hand, the diffusion index measures the proportion of its component indicators that change simultaneously over a certain period in the same direction with the measured variable.

It is important to note that leading indicators are the most important because these can predict changes in the measured series if the lead-time is relatively stable and acceptable.[43]

5.2. The Central Bank coincident index

Since it is impossible with the available data to accurately calculate GDP, the Central Bank instead structured a form of composite index of several coincident indicators measuring economic performance. This provided only a general idea on monthly basis about the overall direction of the change in the economy, but did not calculate the variation in economic performance.

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[43] Peterson, C. and Lewis, C. <u>Managerial Economics.</u> 3rd. New York: Mcmillan, 1994. 152-153

5.2.1. The parameters

From the "Main Indicators" published in the monthly bulletin of the Central Bank, (listed

below) the coincident indicators composing the index were chosen, mainly, for two reasons.

First, they are easily available. Second, it was proven that they are statistically correlated to

GDP. Consequently, they can provide a general idea about the global economic activity.

The main economic indicators are the following:

-Electricity production (In millions of KWH) obtained from Electricite Du Liban

-Imports of petroleum derivatives (In metric tones) obtained from the General Directorate

of Petroleum

-Cement deliveries (In tons) obtained from cement companies

-Imports (In millions of US$) obtained from High Custom Council

-Exports (In millions of US$) obtained from High Custom Council

-Flow of passengers at Beirut International Airport obtained from the Beirut International

Airport

-Cleared checks in LBP and US$ (In millions of LBP) obtained from the Central Bank

-M3 (In millions of LBP) obtained from the Central Bank

-Custom receipts (In millions of LBP) obtained from Custom Council

-Request for information at "Centrale Des Risques" obtained from the Central Bank

-Freight at Beirut Port (In tons) obtained from Port of Beirut. [44]

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[44] Central Bank Annual Report. 1997.

.2.2. The functional relationship

Though the exact relationship between GDP and the chosen indicators to compose the index is not disclosed, yet it was confirmed that a positive correlation exists. According to the Central Bank the chosen indicators are: Electricity production, petroleum derivatives, cement deliveries, flow of passengers, imports, exports, total cleared checks, and M3 (LBP currency in circulation + LBP demand & time deposits + foreign currency deposits).[45]

The freight at the Beirut Port was rejected because it is reflected in the export and import figures. Similarly, the requests of information from "Centrale Des Risques" were logically presumed to be a leading indicator of the economy. On the other hand, the custom duties and imports are indicative of the same activity and the same applies to imports of petroleum derivatives relative to total imports.

5.3. Output of the coincident index

The basis of 100 used for the indicator is January 1993. The index showed an amelioration in the economic performance of 15.47% from December 1993 to December 1994 but this rate of increase was not sustained in the following year. In fact, the index had reached annual averages of 138.9, and 158.2 in 1994 and 1995 respectively, registering a of around 14%. This declining trend continued through 1995, 1996 and 1997. During the last two

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[45] Saidi, Nasser. Personal interview. January, 1998.

years, the index attained 166.8 and 173.5 (Table 5.1) with a declining annual growth of

5.5% and 3.5% respectively reflecting the stagnation that the Lebanese economy is going

through.[46]

Table 5.1 The Central Bank Coincident Index

Month	1993	1994	1995	1996	1997	Variation 93-94	Variation 94-95	Variation 95-96	Variation 96-97
Jan	100	129.8	149.2	155.9	166	29.8%	14.95%	4.49%	6.48%
Feb	94.2	116.2	144.6	150.2	161.2	23.35%	24.44%	3.87%	7.32%
Mar	100.5	135.5	149.9	158.3	166	34.83%	10.63%	5.60%	4.86%
Apr	113.7	135	155.6	150.1	170.3	18.73%	15.26%	-3.53%	13.46%
May	120.2	136.1	156.8	164.8	173.7	13.23%	15.21%	5.10%	5.40%
Jun	126.5	136.3	156.9	169.2	174.1	7.75%	15.11%	7.84%	2.90%
Jul	132	143.7	159.4	179.8	177.8	8.86%	10.93%	12.80%	-1.11%
Aug	130.7	147.6	161.9	182.1	177.7	12.93%	9.69%	12.48%	-2.42%
Sep	130.4	148.7	166	176.4	175.4	14.03%	11.63%	6.27%	-0.57%
Oct	130.3	152	171	175.9	177.7	16.65%	12.50%	2.87%	1.02%
Nov	131.5	142.9	160.1	171.1	178.9	8.67%	12.04%	6.87%	4.56%
Dec	133	142.6	166.9	168.3	183	7.06%	17.04%	0.84%	8.73%
Ann. Avg. Index	**120.3**	**138.9**	**158.2**	**166.8**	**173.5**	**15.47%**	**13.92%**	**5.47%**	**3.46%**

Source: Central bank Internet homepage.www.bdl.org.lb January 1998

5.4. Banque Audi's sectoral index

Similar to the Central Bank's approach to determine the direction of the change in the

economic performance of the country, a different barometric index was calculated from

sectoral indicators.

Audi formulated another barometric model confirming the results of the previous index.

Data about various economic indicators representing the different real sectors of the

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[46] Central Bank Annual Report. 1997.

economy was combined to form the index. The sectoral indicators forming the index are definitely engines determining the direction of economic growth yet no statistical relationship was established to link this latter to the index.

5.4.1. The parameters

Decomposing the economy, nine sectors were identified as being the main GDP components: Agriculture, industry, energy, construction, trade, services (financial and non-financial), the public sector in addition to various activities compiled under miscellaneous. The latter group represents activities that could not be identified due to the lack economic indicators. The sectors do not follow any standard classification used internationally for GDP calculation. They are merely chosen due to the availability of data and using personal judgment. In fact, the sectoral index was formulated based on the results of all the available surveys on GDP structure.[47]

In 1988, a private study by the UNDP divided GDP into the following sectors: 10.6% agriculture, 20.5% industry, 10.1% construction, 28.1% trade, 25.5% services, and 5.2% public administration. Later on, the same organization reported in its 1992 annual

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[47] Banque Audi. Unpublished report sectoral index. January, 1998.

development report that these sectors constituted 6.7%, 14.4%, 9.4%, 27.6%, 29.9%, and

12% of the 1992 GDP respectively.[48]

On the other hand, the Economist Intelligence Unit (EIU), in its latest report about Lebanon

(fourth quarter 1997), used the most recent data (1992) it had found available to describe

the economic activity by sector. According to this source the above-mentioned sectors

composed 13%, 19%, 10%, 27%, 26% and 5% of GDP respectively.[49]

The Central Statistics Department's latest research on the national economy was also taken

into consideration. However, though this is an official institution, it faced some difficulties

in collecting accurate information and had to resort to certain indicators instead of

accurately surveying and calculating each sector's added value. Nevertheless, this source

was assumed to be the most reliable. The CSD reported a 1995 GDP structure of 12.4%

agriculture, 17.3% industry, 9.2% construction, 30% trade, 16% services, and 7.4% public

administration.[50]

The 1993-year was assumed as the base year whereby the index will take a 100 value.

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[48] Lebanon the gross domestic product and gross national income for 1988. The United Nations Development Program. November, 1990. 64.
[49] Lebanon Country Report 4th Quarter 1997. The Economist Intelligence Unit. London: 1996.
[50] Banque Audi. Unpublished report sectoral index. January, 1998.

5.4.2. The functional relationship

It is evident that the economy's structure changes with time yet, it can be noticed that even within the same period the previously mentioned sources disagree on the composition of GDP. Therefore, to choose the weights to be used in the barometric index, considering the available information, on GDP structure, Banque Audi relied mainly on the official and most recent results of the Central Statistics Department (CSD), with certain adjustments.

Accordingly, 17%, 9%, 30%, and 16% were the respective weights allocated to the industry, construction, trade, and services sectoral indicators as determined by the CSD. Nevertheless, the 8% share that was allocated to the agricultural sector was more or less an average implied from the two UNDP studies in which the agriculture sector in 1988 and 1992 constituted respectively 10.6% and 6.7% of GDP. Similarly the weight allocated to the public sector (13%) is very close to the 12% of the 1992 UNDP report. On the other hand, two additional sectors were added to the Audi index. Energy was treated as an independent sector with a 3% weight while an additional factor is a "miscellaneous" item having a 4% share.[51]

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[51]Ibid.

After identifying the weights and the parameters that will form this barometric indicator, it was necessary to find a way to assess each sector.

Hence, within each sector, different parameters were used as indicators. Again here the main criteria in choosing the variables is the availability of data and the logical reasoning concerning the relationship between the sector and the indicators. Though these are not an accurate measurement of the value added within the sector, yet they provide an idea about the sectoral performance when compared with the global economy. To change the sub-sectoral variables from absolute terms into indicators, the year 1993 was considered as a base year. The 1993 estimates of the variables were given a 100 value as indicators.[52]

The imports of livestock, animal products, vegetables, and fats and oils indices with agricultural exports and agricultural credits (in US$ millions) indices were averaged to compute the agricultural index. Similarly, the industry measured using the industrial exports, industrial credits and industrial machinery imports (all in US$ millions) indices. The construction sector index took the same value as that of cement deliveries (in thousands of tons) index.

The trade index was computed from the average of the indices of imports, and total checks clearing (in LBP&US$ million converted into US$). Services index is the average of the financial services (as banking assets, insurance premiums expressed in US$ millions) and

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[52]Ibid.

non financial services (number of tourists, and transport and storage expressed in US$ millions). The latter index was determined from the average of the indices of passengers at the Beirut International Airport and the freight at the Beirut International Port.

The energy index is also the mean of the indices of power production, and private fuel. The miscellaneous sector, regrouping different activities, was estimated from total checks cleared (in LBP&US$ million converted into US$), since they can measure all sorts of economic activities. Finally, the public sector index was formed from total spending index including current plus capital spending.[53]

5.5. The output of the sectoral index

The sectoral index variations for the period 1994-1997 recorded for the first two years a yearly growth of 27% approximately that declined to around 10.5% per annum during the subsequent two years. This index is following the same trend of the Central Bank's index variations since from 1995 onwards, it increased at a decreasing rate recording respectively 23.4%, 18.4%, and 9.0% (Chart 5.1).

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[53] Ibid.

Chart 5.1 Comparative chart of Central Bank's vs. Audi's index variations
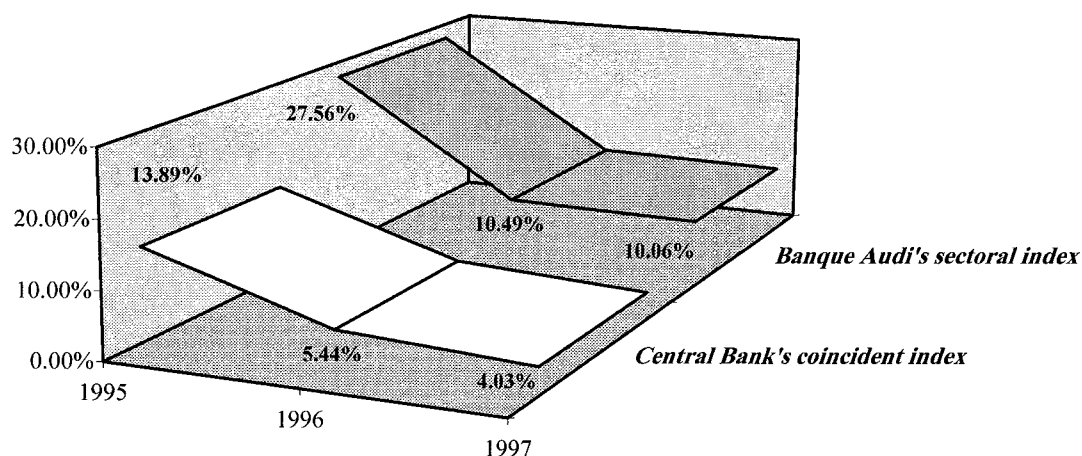
The sectoral index can detect the sectors that have been overperforming the global economy, underperforming it, or in line with it. Hence, from 1993 to 1997 tourism, banking, energy, and the public sectors were overperforming the economy while, agriculture, advertising, trade, construction and transport were underperforming the economy. Industry and some other miscellaneous activities were in line with the global economy.

During the last two years the sectoral indices showed that the same sectors that overperformed the economy during the last four years maintained this standard in addition to the advertising sectors. Nevertheless, the industrial sector deteriorated over this last year with the agricultural and construction sectors underperforming the global economy. Transport and trade moved to become in line with the overall situation.

CHAPTER SIX

CONCLUSION & RECOMMENDATIONS

The structure of the flow of income in the economy allows for various methods of calculating GDP, GNP, economic growth or other national accounts. Hence, either by accounting for the income generated from factors of production or by calculating the ultimate expenditures on the final usage of goods and services, national income is estimated. The sum of the value-added in all industries can also determine the total national income.

Developing countries will definitely not be able to start a system of national accounts using independently the approaches described previously. However, in most nations even developed countries, a combination of all these methods is used since information needed for each approach is always incomplete. Thus, the national accounts were formulated from a mixture of approaches according to the flow of income.

6.1. GDP & GNP estimation problems

Though the available models in Lebanon seem to be elementary due to the weaknesses of the approaches used and the lack of a statistical database, GDP and GNP in general, even outside Lebanon, are still not a perfect measure of the economic performance.

Indeed, there is some confusion concerning the classification of products as whether to include them in GDP as final products or not. For instance public consumption can be considered as an intermediate good to be used in the production of other goods because in the absence of such services the economy would become chaotic. Likewise another example of an ambiguous account is, passengers transport because this can be also regarded as the cost of people going to work.

Thus, countries can adopt different methods. However, international organization like the UN have attempted to organize these methods and proposed a standard system of national accounts in 1968. Currently, only 55% of the economies have been able to adopt this system. Different countries use various systems.[54] In fact, the previous Soviet Union countries used a "Material Product System" that limits the national income accounting to the "production, repair, transportation and distribution of material goods" which excludes all services.[55]

The importance of measuring the national income and precisely GDP started as the outcome of a need to value an economy's production capacity in the short run relative to its potentials in the long run.

However, though the national (or domestic) product is a popular and good indicator of the economy, it fails to account for various negative externalities. It does not account for non-market activities like that of housewives or subsistence output which may be

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[54] Eatwell, J. , Muzzay, and M., Newman, P. The New Palgrave: A Dictionary of Economics . vol.3. London: The Macmillan, 1982. 591.
[55]Ibid.

significant in underdeveloped countries. Nonetheless, this same activity is accounted

for in other more developed countries where a servant replaces a housewife for example,

or the farmers do not use their products as subsistence output but sell some of it. In

other words, GDP or GNP do not account for "structural" differences in economies, in

the sense that each state has its particularities. For example, in agricultural economies, a

large share of output might be omitted since it is considered as subsistence output. It

also fails to account for differences in leisure or working hours. [56] In Lebanon, though

this comparison problem is not significant, it, yet, exists because the industrial sector is

still weak and most of the countryside farmers still use some of their agricultural

products for subsistence.

In comparing GDP or GNP another problem arises which is the exchange rate

conversion problem. This can be strongly felt when different economies use different

exchange rate systems (free versus fixed). To solve this problem purchasing power

parity exchange rate can be used. This concept takes into consideration the purchasing

power when converting currencies by calculating the output of one country at the prices

prevailing in another country. This is another problem in Lebanon, because with the

Lebanese pound depreciating during the war years, prices were distorted. Currently,

though the exchange rate is stable it is not a purely market-determined rate but is highly

managed by the monetary authorities.[57]

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[56] Gillis, M. , Perkins, D. , Roemer, M. , and Snodgrass, D. , <u>Economics of Development.</u> 3rd. ed. New York: W. W. Norton, 1992. 38.

[57] Ibid. 39.

On the other hand, other index problems occur when comparing GDP growth rate from one year to the other. Under inflation (when all prices are increasing) some prices increase at a faster rate than others. In this case it would be important to measure the real GDP growth taking into account inflation. The correct way to take into consideration inflation is to recalculate the GDP or GNP at the prices of one base year (GDP deflator) to remove the effect of inflation, instead of using a consumer price index.[58]

The only available substitute is a consumer price index (CPI) formulated by two independent organizations the "Consultation and Research Institute sarl" and the "Etude et Consultation Economique sarl". Both measure only a basket of goods and not the whole economy's products' changes in prices. Any structural changes in GDP affecting the overall changes in prices would not be reflected in this limited basket of goods and the exchange rate conversion problems previously mentioned will prevail.

Furthermore, using only the variation of GDP, (economic growth) to measure the improvement in the welfare of a state, would be an unjust biased approach. A major weakness of this yardstick lies in its inability to reflect clearly the effect of its increase on the welfare of each segment of the society. The economic growth measured by GDP or GNP is "the rate of growth of the incomes of the upper 20% of the population". This indicator, thus, misrepresents the improvement in conditions of the overall population.[59]

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[58] Ibid. 41.
[59] Todaro, Micheal. Economics For A Developing World. 3rd ed. New York:Longman, 1992.167

A simple example of an economy formed of ten people will illustrate this case.

Assuming that only one of the ten people earns 91 units of income while the others earn

each one unit of income. Total output in this economy would be equal to 100 units of

income. If it increases by 15%, the effect on the ten people will be an increase of 13.6

units of income for the person with 91 units, while those with the one unit of income-

representing the lower income classes in an economy- will have their income increased

by 0.15 unit only.

Therefore, it is clear that the improvement in the income conditions of the people

resulting from economic growth will be proportional to the level of income of these

people. The higher income classes will have a much greater increase in the absolute

value of income. In fact, as previously mentioned, these people have saved more since

they had more income while the lower classes were consuming all their income.

Countries with large differences in income classes mainly less developed countries like

Lebanon will be affected by this unjust distribution of growth. Consequently, in

Lebanon like in other nations, GNP & GDP growth rates are misleading indicators of

the welfare and prosperity of the state, but are definitely indicators of an increase in

opportunities due to the expansion of the overall economy.

6.2. Strengths and weaknesses of the models

Not only the previously mentioned difficulties are encountered when looking for

Lebanon's national accounts. In fact, though during the last seven years the Lebanese

government activated all sorts of recovery programs, the incomplete statistical database

affected the formulation of macroeconomic models. However, the approaches used to measure economic performance can still be considered adequate when taking into account the difficulties faced in gathering data.

By comparing the output of the three economic models particularly in 1995 (since all three sources provided accounts for this year), it is clear that differences do exist. In fact, these discrepancies are not only detected in the values of the national accounts but also in the structure of GDP. Systematic discrepancies between the national accounts forecasted by the CDR and those estimated by Banque Audi start showing from the year 1996 onwards (Table 6.1).

*Table 6.1: Comparative national aggregates of the Central Statistics Department, Council of Development and Reconstruction and Banque Audi S.A.L.**

(In nominal US$)		GDP real growth rates	GDP nominal growth rates	GDP	Imports	% of GDP	Exports	% of GDP	Private consumption	% of GDP	Public consumption	% of GDP	Private investment	% of GDP	Public investment	% of GDP
1991	CSD	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	CDR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Audi	na	na	5,840	3,688	63%	803	14%	5,932	102%	1,175	20%	1,282	22%	336	6%
1992	CSD	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	CDR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Audi	-5.5%	4.2%	6,088	3,737	61%	973	16%	5,177	85%	1,208	20%	2,072	34%	394	6%
1993	CSD	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	CDR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Audi	7.3%	24.9%	7,605	4,744	62%	1,115	15%	7,135	94%	1,358	18%	2,298	30%	443	6%
1994	CSD	na	na	8,924	5,914	66%	754	8%	9,892	111%	945	11%	2,879	32%	370	4%
	CDR	na	na	8,526	na	na	na	na	na	na	na	na	na	na	na	na
	Audi	8.8%	25.5%	9,547	5,634	59%	1,197	13%	8,402	88%	1,832	19%	3,062	32%	689	7%
1995	CSD	6.4%**	22.9%	10,968	7,122	65%	1,202	11%	11,816	108%	1,091	10%	3,370	31%	612	6%
	CDR	9.0%	18.0%	10,064	7,960	79%	1,945	19%	10,240	102%	2,588	26%	1,628	16%	1,624	16%
	Audi	7.4%	23.4%	11,777	6,938	59%	1,419	12%	9,420	80%	2,787	24%	4,139	35%	951	8%
1996	CSD	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	CDR	9.0%	14.7%	11,539	8,825	76%	2,225	19%	11,617	101%	2,836	25%	2,002	17%	1,685	15%
	Audi	4.7%	18.4%	13,946	7,109	51%	1,459	10%	10,945	78%	3,739	27%	4,018	29%	895	6%
1997	CSD	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	CDR	9.0%	13.9%	13,139	9,891	75%	2,545	19%	12,854	98%	3,173	24%	2,705	21%	1,752	13%
	Audi	3.6%	9.0%	15,198	7,583	50%	909	6%	11,820	78%	5,095	34%	4,039	27%	918	6%
1998	CSD	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	CDR	9.0%	13.4%	14,895	10,685	72%	2,912	20%	14,605	98%	3,571	24%	2,782	19%	1,710	11%
	Audi	3.0%	8.2%	16,437	8,242	50%	1,200	7%	19,792	120%	7,250	44%	7,150	43%	1,300	8%
1999	CSD	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	CDR	8.0%	12.2%	16,717	11,816	71%	3,331	20%	16,265	97%	3,892	23%	3,267	20%	1,778	11%
	Audi	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
2000	CSD	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	CDR	8.0%	12.3%	18,770	13,193	70%	3,811	20%	18,149	97%	4,337	23%	3,939	21%	1,728	9%
	Audi	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
2001	CSD	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	CDR	8.0%	12.2%	21,060	14,448	69%	4,359	21%	19,987	95%	4,797	23%	4,568	22%	1,797	9%
	Audi	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
2002	CSD	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	CDR	8.0%	12.4%	23,666	15,659	66%	4,987	21%	22,806	96%	5,277	22%	4,518	19%	1,737	7%
	Audi	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
2003	CSD	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	CDR	7.0%	11.2%	26,324	17,347	66%	5,705	22%	25,262	96%	5,743	22%	5,154	20%	1,807	7%
	Audi	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
2004	CSD	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	CDR	7.0%	11.2%	29,280	19,210	66%	6,527	22%	28,094	96%	6,123	21%	6,010	21%	1,736	6%
	Audi	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
2005	CSD	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	CDR	7.0%	11.3%	32,584	20,206	62%	7,297	22%	31,494	97%	6,610	20%	5,731	18%	1,658	5%
	Audi	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
2006	CSD	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	CDR	6.0%	10.2%	35,912	22,228	62%	8,158	23%	34,790	97%	7,048	20%	6,575	18%	1,570	4%
	Audi	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
2007	CSD	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	CDR	6.0%	10.2%	39,582	24,464	62%	9,121	23%	38,467	97%	7,479	19%	7,346	19%	1,633	4%
	Audi	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

* na refers to not available

** the CSD real growth rate was computed using the GDP deflator provided by Banque Audi S.A.L. since the CSD could not provide an inflationary figure

The nominal GDP figures released by Audi for 1995 and 1996 are higher than the CDR's and CSD's corresponding estimates. The real growth rate forecasted by the CDR is exaggerated relative to that of Banque Audi and the CSD (for 1995) while the nominal rate is lower. For both years 1997 and 1998, the CDR real and nominal growth rates appear overvalued relative to those of Banque Audi.

In fact, comparing the share of private investment of GDP of the Horizon 2000 with the corresponding figure of the CSD and Audi's model, it is clear that the CDR overestimated the public investment at the expense of private investment not only relative to other models' estimates, but also with respect to the government's capital expenditures as released by the Ministry of Finance. Though the Ministry of Finance is the only common source used in all models, some differences are witnessed between the public consumption and public investment released by the CSD, CDR and Banque Audi's. Nevertheless, it is important to recall that the CDR model is a forecast and not a calculation of the national aggregates as that of the CSD and Audi's (Table 6.2).

Table 6.2 Public expenditures vs. public consumption & investment in US$ millions

Year	Current expenditures Ministry of Finance	Public consumption			Capital expenditures Ministry of Finance	Public investment		
		CSD	CDR	Banque Audi		CSD	CDR	Banque Audi
1993	1,670	na	na	1,358	282	na	na	443
1994	1,970	945	na	1,832	474	370	na	689
1995	2,827	1,091	2,588	2,787	646	612	1,624	951
1996	3,556	na	2,836	3,739	554	na	1,685	895
1997	5,095	na	3,173	5,095	952	na	1,752	918

Source: Ministry Of Finance, Banque Audi, Council Of Development & Reconstruction, & the Central Statistics Department

Exports and imports are also differing from those provided by the High Customs Council in all three models. Only the CSD provided the closest estimates while the

forecasts of the CDR were constantly overvalued and those of Banque Audi were

adjusted according to the constraints of the model.

Table 6.3 Imports and Exports Statistics 1991-1995 in US$ millions

Year	Imports				Exports			
	High Customs Council	Audi	CDR	CSD	High Customs Council	Audi	CDR	CSD
1991	3,727	3,688	na	na	539	803	na	na
1992	3,565	3,737	na	na	559	973	na	na
1993	4,939	4,744	na	na	458	1,115	na	na
1994	5,990	5,634	na	5,914	572	1,197	na	754
1995	7,303	6,938	7,960	7,122	824	1,419	1,945	1,202
1996	7,559	7,109	8,825	na	1,018	1,459	2,225	na
1997	7,456	7,583	9,891	na	642	909	2,545	na

Source: High Customs Council, Banque Audi, Council Of Development & Reconstruction, & the Central Statistics Department

6.2.1. The Central Statistics Department input-output model

In general, an input-output model is not only used for the computation of national

income but also the planning of national development because the model reflects the

structure of the economy. The input-output matrix can be viewed as a production

function with detailed sectoral coefficients of production. Using this approach, a

projected economic growth can be achieved. Nevertheless, this can only be used in the

short-run because any technological advancement will modify the structure of the

economy and consequently, the coefficients of production can deform the relationship

between economic growth and its impact on each industry.

Using an international standard economic approach, the CSD input-output model results

are the only official statistics since they are published by a public organization

established for this purpose. In fact, national income is not only determined using one

approach. Instead, the value added, the "earnings side", and the "expenditures side" of

income are also computed. Based on the three approaches the output was checked, consequently, the validity of this system is reinforced.

However, the CSD input-output model is a lagging model. Its results are not useful because of a two years lagging period. The approach's characteristic, which is planning economic growth, was defeated as the national output of the years 1994 and 1995 was calculated in 1997.

Furthermore, few of the economy's sectors were assessed using a sectoral census. Instead, mainly estimations and indicators were used. The transport sector was undervalued because only passengers transport was included. Similarly, since the agricultural industry's production evaluation is based on indicative figures any overvaluation in this sector coupled with an underestimation of exports would result in an excessive amount of households disposable income.

As for the public investment and public consumption, the CSD opted for classifying by itself the different spending items of the government adopting an accurate categorization of expenditures to meet national accounting standards. For instance, the spending on civil defense was not included in capital spending but in current spending which is a more accurate classification according to international accounting systems.

It is also worth mentioning that the CSD could not provide an inflation rate to compute the real variations in national income. Consequently, the real growth in the economy could not be measured.

6.2.2. The Council for Development & Reconstruction Horizon 2000

The importance of the CDR model is that at a certain time it was the only source providing a long term forecast to be used as the basis for a national recovery plan. Economic data for the coming twelve years (since 1995) could not be found anywhere.

However, it is important to note that the Horizon 2000 is a forecast of national accounts but not a calculation of the present accounts. The CDR forecast of national accounts is based on a public finance module projection. Basically, it is the assumptions underlying this latter that are the reason behind the discrepancies, since public consumption and public investment were determined as the current and capital spending of the government's budget.

The Horizon 2000 model projects a domestic inflation rate dropping from 7.5% in 1995 to 4% from the year 2001 onwards, while actually it has been reaching much higher levels according to different sources. The most conservative Consumer Price Index (CPI) formulated by "Etude et Consultation Economique" recorded regularly a double digit inflationary rates in 1994 and 1995 and around 8% in 1996. Furthermore, the Lebanese pound has been appreciating for the last four years and attained in 1997 a (6.5%) level lower than that expected by the Horizon 2000 (US$1660/LBP vs. US$1552/LBP end of 1997). This definitely affected forecasted exports relative to the realized figures.

In addition, though the total debt to GDP ratio surpassed the 92% expected, the foreign borrowing was actually obtained, at a higher interest rate cost than the 7% assumed in the model and was used to finance other than the Horizon projects. The CDR's conditions of the foreign borrowings were highly optimistic since with the structural fiscal problems and the political situation in Lebanon, it is difficult to attain these terms. This affected the forecasted public consumption item of years 1995 to 1998 that was continuously below the estimates of Banque Audi.

The actual fiscal aggregates, also, showed a deviation from the Horizon 2000. The average government revenues reached actually an average of 15.9% of GDP from 1993 to 1996, and 17.4% for 1997, which are way below the CDR's target of 19% to 27% from 1995 to 2007. Further, the expenditures did not decline as expected from 26% in 1995 to around 19% in 2007 instead, the average registered for the 1993-1996 period was around 25%.

Hence, the discrepancy resulted from an optimistic forecasted budget balance that did not materialize due to higher current expenditures and lower revenues obliging the government to reduce its capital spending (relative to the CDR's forecast) in order to decrease the overall budget balance.

Another drawback of the model is the overvalued real growth rate resulting from an underestimated inflation rate. The CDR used the Harrod-Domar equation to calculate investment for years 1994 and 1995. The ICOR for years prior to 1996 differed from one model to the other yet, that year showed that the ratio assumed by the CDR took the

same value as that calculated under the CSD and Banque Audi models. However, the ICOR level could not be sustained at this low rate for a very long period. In fact, the CDR did not consider that as time passes especially for a period as long as that of the Horizon 2000 the ratio could rise.

The reason behind the large deviation between the private investment figure of the CDR and that of other sources is due to the discrepancy of the public investment figure. In fact, as observed in Table 6.1 public investment determined by the CDR is constantly differing from other sources estimates. This in turn is affecting also the private investment since it is calculated as the balance between public investment and total investment that is obtained from a Harrod-Domar equation based on an exaggerated real growth rate and an undervalued inflation rate.

In brief, the main weakness of this approach is due not only to the assumptions used in calculating national accounts. Actually, the national aggregates are not calculated as a function of the correlated decision variables according to a statistical relationship between dependent and independent variables. In other words, the consumption, for instance, was not determined according to the level of disposable income. Investment (mainly private investment) was considered independent of the level of domestic and foreign interest rates and was not related to it in any functional relation. Hence, all national accounts were derived from an unrealistic public finance hypothesis.

6.2.3. Banque Audi's model

Banque Audi was the sole provider of national accounts for the years 1991 to 1993, yet its model is not flawless. The data obtained from the fiscal budget (the Ministry of Finance) is the most reliable, yet to secure a level of consistency in the model, it was modified to fit different other constraints like the intersectoral relation between the funds' uses and resources according to each agent. Moreover, personal opinion was also used in adjusting these figures.

Maintaining a balance between the money market and the goods market reinforces the model. In addition, using a price index formulated by another independent institution specializing in creating a consumers basket of goods (the ECE) and following it meticulously will also increase the reliability of the released figures. Though the consumption time series was not disclosed, having such equations in the model reinforces the credibility of the model.

Nevertheless, the approach has some drawbacks. The function estimating private investment considers only construction indicators without any machinery or equipment. The autofinancing rate coefficient used to adjust the private investment figure according to banks lending policies has not been modified since 1991, while currently credits are growing due to more aggressive banking operations. The model is also based to some extent on opinion polling and personal judgment, which definitely could affect the objectivity especially when considering forecasts.

6.2.4. The barometric indices

The major weakness of both indices is that they are both coincident and their usage is limited while leading indicators could have been more advantageous and useful to analysts. Audi's and the Central Bank's indicators can not provide a quantitative measure of the evolution in the economy nor do they have the predictive characteristic of leading indicators.

In particular, using economic indicators statistically related to national output in the formulation of the Central Bank coincident index, a greater reliability is attributed to this latter. The sectoral index of Banque Audi incorporates indicators of the most important economic sectors weighted according to the GDP structure, providing a closer look at the variations of each activity relative to the expansion of the economy. The coincident index does not take into consideration these indicators, and consequently, this latter can not detect the performance of each economic sector in addition to the global economy. Further, the sectoral index gives only annual results while the coincident index has an advantage because it is calculated on monthly basis.

6.3. Recommendations

Of the previously discussed models, it is evident that none can be considered a macroeconometric model since, though the macroeconomic approach exists, the econometric methodology is still rudimentary. Another common weakness of all models is the unavailability of data. The available indicators of economic activity are

often replacing the statistical information needed to formulate a model of national aggregates.

To solve this problem, (existing in most underdeveloped nations) an effort should be put to compile information according to certain priorities though all the above mentioned problems should be tackled. The difficulty in obtaining statistical data and the degree of its importance in the accounting of national aggregates should determine the priorities to be followed in improving the availability of economic data.

Since the government's accounts are available in any state, these are the first to be compiled and would serve as a basis in compensating for other shortages. These should include the monetary system accounts, external transactions, and the fiscal accounts reflecting the operations of the government. In particular, the government budget and accounting records provide the necessary database when calculating the income of this agent, considered as a producer of goods and services. Similarly, banking regulations and other laws controlling financial institutions can also assist in finding information about these institutions flow of income.

The following priority could be the compilation of data on production of goods and services. This need is considered at this stage because it is critical for planning development and is relatively possible in nations that are still in an early stage of statistical progress. At a further phase, more difficult but basic data is needed on income expenditures in terms of consumption expenditures and capital formation.

Subsequently, at a final stage would come the compilation of information on capital financing, other financial assets and liabilities, the spending behavior of households, and other supporting data that are highly important but are difficult to gather.

In Lebanon, having the government accounts available; the subsequent important need is the collection of accurate information on the production of two basic economic activities vital for planning and constituting a large share of locally produced commodities. The sectors with significant statistical shortages are the manufacturing sector and the non-financial services sector.

Industry information is not only needed for national output accounting. As a matter of fact, cost structure of the manufacturing sector is a driving force of economic growth. It is essential for planning development and formulating government policies. This data can also be used to check the imports and exports statistics.

Furthermore, the manufacturing sector can furnish data on capital formation since it is unavailable. This factor of production is also essential for creating economic growth and upgrading an economy. Therefore, it is necessary to conduct a survey to offset this shortage since all investment expenditures in Lebanon were estimated by official and unofficial sources based on indicators and omitting highly important elements of this account (like the value of machinery and inventory).

On the other hand, it is clear that, the Lebanese non-financial services (education, health care, independent professions like maintenance, repairs and others) are not very well

identified in any of the models. In addition, a census on the services provided by not-for

profit organizations is also as necessary, since these institutions are providing all sorts of

unaccounted services to the community. Consequently, some effort is needed to find a

database on the activities sector especially that the overall services sector, accounts for a

significant share of the Lebanese national income.

On the "expenditure" side, an important shortage prevails in Lebanon when considering

the consumption expenditure estimated by the models based on indicators. No studies

are available to exactly calculate the spending habits of the different agents of the

economy. Only recently, a survey (1997) by the CSD was conducted to determine the

spending structure of households.

Nevertheless, as previously mentioned, economic growth and GDP/GNP estimation is

not enough to detect the improvement in the nation. Lebanon, like any developing

country still needs social indicators that can find out whether the society is benefiting

fairly from any economic growth. Without these measures the gap between the different

income classes in the society will widen as national income increases. Economic

growth, consequently, would not improve the welfare of society though it would create

more opportunities. Hence, information about the structure of income classes and the

growth of income by class is needed to make sure that the whole society is taking

advantage of this progress.

Finally, to recapitulate, it is evident that this substantial shortage in national statistics

will remain an obstacle that would slowdown the rise of the nation. Though the first step

towards the state's welfare is through economic growth, this latter will remain

vulnerable in Lebanon since it is not based on sound economic analysis. Along with the

infrastructure and social recovery plans, the Lebanese economy imminently needs more

sophisticated statistical tools than the previously studied macroeconomic models, to

serve as the foundation of the nation's development planning.

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