Theoretical Framework of Financing Subsidized Housing in a Developing Environment

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Theoretical Framework of Financing Subsidized Housing in a Developing Environment

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Abstract

This paper is aimed to present a theoretical framework of financing subsidized housing, considering the experience of a developing country, which is Palestine. The paper suggested new innovative techniques related to financing subsidized housing programs that may be offered through public firms, cooperative, local business and international business firms. In addition, their relevant investment formulas and models have been articulated and presented using different bases.

The features of the suggested innovative methods of financing subsidized housing are to assure the continuity of the related specialized institutions. To prevent allocated principal funds from being exhausted, in order that the funds may be rotated for others beneficiaries. To keep the cost of financing as a minimal as possible. To maximize the subsidized margin, using various ranges of margins to fit all social classes of beneficiaries.

1. Introduction:

The housing sector is one of the most important parts of every economy, whether it is in a developed or developing environment. Its importance comes from the fact that a house is a concern of every individual and family. In addition, the housing sector has several economic advantages including offering job opportunities, serving related industries, and fulfilling the social function of the society. In most countries the housing

sector witnesses prosperity as well as depression periods according to the political and economic trends of that particular country. The housing sector may be categorized as follows: a- Private and public housing b- Single family and multi-family housing c- Owner-occupied and renter occupied housing.

However, the private housing units attract the most concern, because it is related to finding a shelter to live in, known as a dwelling unit. The demand for private housing units comes from several parties, such as newly formed families, families and individuals needing to improve their present dwelling units, and those waiting to replace their dilapidated units. Generally, the demand for modern housing is increasing rapidly, the ratio of urban population for the world has increased from 35% as in 1970 to 42% as in 1992 [World Development Report, 1994, p. 223]. The supply for the housing sector comes from a- households who arrange the construction of their own family housing units. b- speculative builders and/or developers of both single-family and multi-family units. c- the government projects. In housing sector, based upon supply and demand the price of a house is supposed to be set at a fair price. However, in Palestine as well as in most countries, the price may be unaffordable for many buyers in spite of their desires and urgent needs.

Therefore, this study aims to discuss the theoretical framework of financing subsidized housing, to suggest new alternative methods of financing housing relevant to the developing environment in general and to Palestine state in particular. And to explain the investment analysis techniques, which may be used to evaluate the financing housing projects. In more details this study intends to discuss the following issues:

- To state the possible means and institutions that may be considered in financing subsidized housing programs in a developing environment.
- To assure the continuity of the specialized institutions without exhausting any part of the principal funds, so that these funds can be rotated.
- To keep the cost of financing at a minimum level and maximizing the possible ranges of subsidized margin.
- To suggest the relevant capital investment formulas that would evaluate the financial feasibility of the subsidize programs.

- To suggest other indirect governmental means of supporting housing sector, such as stating relevant policies and regulations, supporting financial institutions related to the housing sector, establishing specialized institutions to finance housing programs related to low-income families, and using income tax laws to direct investments towards special housing programs.

Most of the developing countries witness a significant shortage of housing units constructed to accepted standards, a fact that may be discovered by comparing the demand for housing units and the supply under normal conditions. This situation may lead to many families having no place to live or living in sub-standard units. As a result, most governments use subsidized housing programs in one way or another in order to increase the supply of the needed housing units. However, the equilibrium of the housing units market may differ from one environment to another and consequently the characteristics of the housing sector may also differ.

In a developed environment such as the USA, the financial institutions and interest rates play a critical role in determining the supply of housing units and in understanding the housing marketing Equilibrium [Gerber, 1985] and the high correlation between the cost of financing and housing supply. Geoff [1999] concluded that in the long run the demand side of the Irish housing market could be modeled using a stable relationship between house prices, the housing stock, income and mortgage interest rates. In the developed countries, due to the role of the financial institutions, there is less need for subsidized housing compared to developing countries.

In the developing countries the need for subsidized housing is very high because the shortage of housing units is very significant. This is due to a number of reasons:

First; the lack of the organized private financing institutions, especially those related to financing the housing sector. For example the ratio of new mortgage lending from formal financial sector to total housing investment is about 16% in developing countries compared to 85% in the developed countries [Bukley, 1994]. Second; the low rate of return from construction firms, especially for projects related to low income families. Third; the increasing cost of Housing construction, land and the needed

infrastructure projects. Fourth; the high cost of financing for long-term housing loans. This may be due to the high risk in the developing areas related to the weak contract enforcement and the high administrative cost of financing housing program which reaches to 4%, and which eventually lead to limited demand for housing financing [Malpezzi and Mayo, 1987] and [Bukley, 1994].

To cope with the above-mentioned causes of housing shortages and to facilitate offering residential housing units, especially for low-income families, governments in both developed and developing countries contribute in several ways. These ways include carrying out specific housing projects, stating relevant policies and regulations, and/or allocating special funds for housing. In developed countries such as the USA, the means of subsidizing housing include: First; supporting financial institutions related to the housing sector through special regulations and control systems. Second; supporting the mortgage system of financing housing by establishing specialized institutions such as the Federal Home Loan Mortgage Corporation and the Federal Home Loan Bank System [Seiders, 1982]. Third; establishing specialized institutions to finance housing programs related to low-income families such as the Government National Mortgage Association and Neighborhood Reinvestment Corporation. Fourth; using income tax laws to direct investments towards special housing programs such as low-income housing programs [Segal and Bird, 1988].

In the developing countries that are facing continual increases in both costs of financing and cost of construction, more direct programs are usually carried out, such as distribution of housing to low-income families, granting funds to be allocated for building housing units and granting of interest-free housing loans. However, the above programs and sources of funds fluctuate according to the availability of public sources of funds and changing of policies and priorities. Accordingly, the question always arises as to whether or not to keep the subsidized housing programs going, and whether to create self-perpetuating channels of subsidized housing units, instead of implementing programs that become exhausted. In addition, most subsidized housing programs consider only demographic elements and social benefits, and are rarely financially evaluated as to their feasibility as other business projects are evaluated before implementation, for instance industrial [UNIDO, 1986] and agricultural projects [Gittinger, 1982]. However, few

researches discussed some aspects of housing subsidies such as [DuBock, 1988], [Lewis & David, 1986] and [Bukley, 1992] but not as a part of financial evaluation techniques. Recently the World bank with the cooperation of the United Nations Center for Human Settlements developed housing indicators to evaluate housing policies and programs for local and national levels [The World Bank Annual Report, 1994, p. 47].

Therefore, there is a need to explore the issue of financing subsidized housing programs taking into consideration the new notion of the role of the state in enhancing the development of the economy. The new notion of the state role in the economy may be summarized as follows:

First; to privatize the majority of state owned enterprises if such institutions are not working in an efficient manner. Between 1980 and 1992 more than 15000 state enterprises were privatized worldwide [Kikeri, Nellis, and Shirley, 1994]. Zhang [2000] discussed the restructuring of housing finance in China and concluded that the increasing housing crisis made the government to develop the financial institutions and instruments and to relax the government's control. However, the liberalization of financing housing is not always a successful story. Smets [1997] concluded that the liberalization and financial reform policies of India housing finance are not as successful as may be expected.

Second; if the state enterprises should continue as public sector, they have to be subject to specific performance and profitability measures. Several countries introduced innovate ways of financing housing to serve the social target of financing housing. Addae-Dapaah and Leong [1996] evaluated the applicability of some of the housing-finance schemes in Singapore and concluded that the Sale-Leaseback has the greatest potential for resolving the housing finance problem of the elderly in Singapore. Lee, Michael (1996) reported the experience of Indonesia in introducing innovative methods of financing housing including a secondary mortgage facility, and non-mortgage construction loans programs, and concluded that conditions are now sufficiently stable for the market to continue to mature.

Third; government may finance and interfere in some sectors for social return. However, it should be noted here that some studies criticized the role of state in direct financing for specific sectors based on social notion, such as the intervention of government in rural credit marker which were disappointing [Hoff and Stiglittz, 1990]. Another study indicated that the government direct financing is shifting from real state to export promotion in some countries [Stiglittz, 1993]. Husock [1997] reported that the devoting government resources to subsidized housing for the poor in the form of public housing or even housing vouchers is not just unnecessary but also counterproductive.

With regard to the above mentioned conditions it may be difficult to leave housing sector to private business only. Therefore, there is a need for state interference in financing housing projects under the conditions that these projects be financially evaluated. This paper aims to suggest several self-continuing means and institutions, which may be used in this regard.

The experience of the subsidized housing programs in Palestinian will be summarized as an example of developing environment. Thereafter investment analysis models of financing housing programs will be developed, and formulated. Such suggested financial models might be adapted by central and local governments as an alternative for the direct subsidized programs. The models will include suggested institutions and financial instruments. The theoretical investment formulas and bases that may be applicable to most developing countries will be presented in order to fulfill the social and economic objectives of subsidizing housing sector.

The remaining of the paper is organized as follows: second part is related to the financing of housing and the subsidized experiences. Third part is related to discuss elements and concepts of Subsidized housing. Fourth part will be devoted to The suggested innovate means and channels of financing subsidized. The final part includes summary and conclusions.

2. Financing of housing in Palestine

The economic role of the housing sector in Palestine is considered as the third important economic sector, it forms about 16% of the gross domestic product and 60% of the fixed capital formation. It employs almost 10% of the total employment inside Palestine. The average housing cost of a Palestinian family forms about 7% of the total living cost excluding the utilities [Sabri, 1992]. The supply of housing sector in Palestine comes from various groups including public sector of both central and local authorities, non-profit institutions, cooperatives, and private sector. The total number of housing stock is estimated at 300,000 housing units in 1993, the average housing unit includes six persons. The demand for residential housing units forms about 95% of the total housing demand and comes from new established families, and others looking to improve their existing housing units. Commercial and industrial sectors form 3% of the demand and the public purposes form about 2% of the total demand.

The housing sector in Palestine faces various problems: First; the lack of the housing supply as a consequence of the occupation situation and their policies, the issue of housing shortages was not clear so sharply, because most of the new established families were living with their parents and/or because the temporary emigration of many Palestinian families working out side Palestine [Sabri, 1978 and 1991] Second; there are no encouragement laws or tax policies which support the investments of housing sector existed in Palestine. Third; there are other existed problems such as the transferring of ownership and registration of the lands, problems of registering an apartment in a complex building, and the lack of the specialized housing institutions.

The investment in private housing in Palestine during the period 1971 to 1999 was large by international standards except between 1988 to 1990 (the years of the intifada). In-spite of the non-existence of financing instruments. This many be related to the following reasons: a- The contribution of Palestinians working outside Palestine (Arab Gulf and USA). The majority of investments in private housing and commercial complexes came mainly from Palestinian transfers. The investments in housing from Palestinian transfers form 80% of the investments in commercial housing between 1989 to 1993 as estimated by the author. b- for local residents building a house is the safest venture during occupation,

curfews and sieges. The price of property is always increasing, therefore it is the best investment opportunity because of the appreciating value of the property for most of the Palestinians, and especially who have the relevant served lands. c- with the absence of banks and financial institutions, building a house becomes a way of saving.

There is a limited contribution of business speculative builders due to the low rate of return of the housing business for either renting or selling. The main problem is the increasing cost of construction, beside the number of idle days in implementing long-term projects due to the political situation. The majority of private housing build for own use not for rent, i.e. owner occupancy inn Palestine is estimated at 69% in the West Bank and 98% in Gaza Strip compared to 63% in ten similar countries including Jordan, Turkey, Chile, Poland, Mexico, Malaysia, Tunisia and Algeria [World Bank, Developing the Occupied Territories, 1994, p. 95]. This is mainly related to the rent law known as the protection of renter law, which prevent owners increasing the rent amount regardless of the inflation rate, among others conditions in favor of the renters rather than the owner.

The present rate of return of the rented housing is very low compared to other businesses. The rate of return was about 5.1% in 1966, it decreased to 5.9% in 1997, While the rate of return for renting of commercial building is higher than family houses, which lead most of speculative housing builders to select commercial projects rather than family housing projects. The rate of return for renting commercial buildings ranged from 7% as minimum to 15% as maximum. This is mainly because the low cost of commercial housing with less finishing materials and the high returns paid by business firms [Sabri, 1997].

The average weighted ratios for Palestinian housing construction inputs are 24.51% for labour cost, 51% for the materials, and 24.6% for other cost items. The materials input include items produced by 14 related industries [Sabri, 1998]. The situation of housing in the West Bank is much better than in Gaza Strip, due to the fact that 45% of

the population in Gaza Strip are living in UNRWA Housing camps compared to only 16% of the population in the West Bank

2.2 The experience of subsidized financing housing in Palestine

During the last two decades, there were four major subsidized housing programs that had been implemented in Palestine. First two programs were implemented between 1980 and 1985. They aimed to offer direct grants to subsidize building housing units. They included grants of $ 20,000 for 1,400 cooperative members and 2,159 grants for individuals offered by the Jordanian-Palestinian Committee [HABITAT, 1987]. The total amount distributed to cooperatives and individuals was $ 66 million up to 1985, which were granted by some Arab countries [Jordanian- Palestinian Joint Committee, 1987].

The other two programs were implemented by the Palestinian Housing Council (PHC) and the Palestinian ministry of housing. The PHC implemented 12 projects in the West Bank and 5 projects in Gaza Strip From 1993 to 1997. The total housing units built by the PHC were 574 units in West Bank and 1,178 units in Gaza Strip. The aim of the PHC was to sell the housing units for low-income families at affordable prices and conditions. The total allocated investments of PHC was US$ 70 million at the end of 1997, financed by grants offered to the Palestinian National Authority [The PHC Bulletin, 1997]. The ministry of housing implemented five housing projects implemented by the Palestinian Ministry of Housing in the Gaza Strip and the West Bank during the period from 1996 to 1999.

The experience of the first two programs, which used direct grants, faced serious obstacles, which may be summarized as follows:

First: the high cost of the subsidized cooperative units which was built through these projects. The researcher analyzed the cost of many of the completed cooperatives housing units which were build during the period 1980 to 1988, and found that 70% of the units had a cost between $ 45,000 and $ 75,000, and only 15% of the total units had cost of less than $ 45,000, while about 15% of the total cooperative units had a cost of more than

$75,000. This situation was due to the luxury type of building. Accordingly, the granted loans contributed to only an average cost of 30% of the total cooperative housing units, in some cooperatives the ratio was only about 10% to 15% only. However, to get an idea about the financial situation of the subsidized cooperative societies. It was estimated that the granted amount suppose to cover 100% of the cost of building affordable family house as long as the receiver has the land. Substantial parts of housing units in Palestine are considered as luxury units. The average size of a housing unit built in Palestine is increasing (from 120 m^2 as an average during the period from 1968 to 1990 to 140 m as in 1992, built in a large lot, of 500 m2. This is higher than the median of similar ten countries { 61 m^2 of a lot size of 96 m^2} [World Bank, Developing the Occupied Territories, 1994, p.96]. A substantial share of private housing units for residents in Palestine are considered as luxury housing units built from stone [Sabri, 1997]. The average cost is increasing significantly during the period 1967 to 1996. The Average Cost per sq. m was $ 45 in 1970, it increased to $ 150 in 1980, to 250 in 1990 to $ 542 in 1998.

Second: as a consequence of the luxury cooperative housing units which were built by the projects, many of these units not completed yet, it was estimated that 70% of the total cooperative units not completed after five years of starting operations. However, the degree of the completion is varied from one cooperative to another and from one house to another inside the same cooperative.

Third: It was no enough allocated funds to establish the needed infrastructure, many of the cooperative complexes located in remote areas which have no major facilities and utilities. This was a second reason, which lead to discourage many members from completing their housing.

Fourth: There was no clear policy concerning the qualifications of the beneficiaries, and it was a unfair distribution of grants among beneficiaries and regions, since most of the cooperatives which got the grants were mainly in few districts.

Fifth: because of the subsidies were implemented as grants, the two projects were ended due to the end of allocated funds. However, if those grants were refunded loans, this project may have a self-continuity, and funds might be rotated to other beneficiaries.

For the other two programs, which were implemented by ministry of housing and the PHC, there were other problems faced the implementations of the projects. The final cost of the housing units was higher than the private price in some locations. There were substantial part of the allocated funds spend on administration expenses and bureaucracy. The implication periods of projects took two to three times of the respected business projects, which increased the final cost of the housing units. In addition, there was no contribution from the local financial systems neither in implementing the programs, nor during selling the housing units to the beneficiaries. Today, there are 23 banks and 115 branches working in Palestine, but the loans allocated to finance housing is limited to $ 332 million in the last four years (1996 to 2000), which formed only 12% of total granted loans during the same period [PMA, 2000].

3. Cost of Subsidized Housing:

Subsidized housing means reducing the cost of purchasing a housing unit below what the market would otherwise dictate. The reduction of the cost may vary in its extent and conditions. Considering its extent, the reduction ranges from 100% (in case of distribution of free houses) down to just 1%. The subsidy may cover all or a part of the principal amount and/or the interest cost, a deduction in the down payment, or an extension in the number of years of the principal amortization.

Accordingly, the extent of the subsidy for housing may be defined as the difference between regular prices, market interest rate and housing sale conditions determined by the free market and the stated respective prices, interest rate and sales conditions for subsidized housing units. The difference between the two prices, known as the subsidized margin, is usually financed through public funds. The subsidized margin has a financing cost, which is a percentage of the market interest rate and/or the principal amount. Therefore, there is need to discuss the interest rate factor and its role in financing subsidized housing programs.

Theoretically, market interest rates are based on the intersection of the supply and demand of capital. However, practically the interest rate may be stated based on the following components: a- a percentage to cover the annual general and administrative

expenses. b- a percentage to cover the risk and bad loans. c- a percentage to meet the cost of capital and funds. d- a percentage to meet the expected inflation rate. Concerning the related institutions of subsidized housing the above four components may be considered as follows:

A: To cover **administration expenses**, the greater the efficiency in running the activities to the related institutions, the less are the administrative expenses needed, Generally, 1% to 2% is the average cost of the total funds for the administrative expenses. However, the related institutions may need to invest a part of their assets in market securities, in order to generate annual returns to cover a part of the annual expenses.

B: To cover the **risk and bad loans**, it is difficult to estimate a fixed rate to cover the risk factor of lending money, in spite of existing financial models which aims to establish relationship between the risk premium required by holders of bonds and the actual default experience of these bonds [Fons, 1987]. However, the risk of housing loans may be less risk than other long-term loans if loans are secured by properties. However, the fact that there is a significant rate of a default risk of not paying the installments at the times due, since the repayments are due monthly. Thus, a percentage of the total loans should be deducted to cover possible losses in this regard. It is worth mentioning that other risks such as future increasing interest rate should not be considered in the case of financing subsidized housing.

C: To meet the **expected rate of return** of funds, which may be determined based on the structure of the liabilities and owner equity of the institution. However, in case of the related housing institutions which does the public own and financed through free or low interest long-term loans, the rate is expected to be at a low rate.

D: To cover **the inflation rate**; currently, most of the countries witness a continuous increasing rate of inflation. This situation creates a real problem for long-term money market, especially for housing loans [Lessard and Modigliani, 1975], which have long-maturity periods ranging from 10 to 25 years. To consider the inflation rate which increase the interest rate to a high nominal interest rate is not an easy task. However, many research discussed this issue and suggested several methods such as using index of

inflation, or using dual index instrument which may safeguard both groups by indexing payments to prices [Bukley, Lipman and Persaud, 1993]. Accordingly, several methods may be used, such as:

1- a fixed premium rate may be added to the actual interest for all periods.

2- a variable rate that is connected with the national price index may be stated and added annually to the monthly repayments.

3- an interest rate adjusted to the average market rate, which reflect the inflation rate among other factors. However, it should be noted that the issue of inflation becomes more critical if loans are granted in the local currency. The local currency in most of the developing countries witnesses a high percentage of devaluation in the long term. Therefore many financial institutions in the Developing countries may connect loans for one or more of the hard currencies in order to protect their assets.

The subsidized housing margin may cover one or more of the above four components, or may be extended to the principal amount according to various subsidized programs, as indicated in Table No. 1. However, it should be noted here that the interest rate might be considered as the discount rate when considering the present value of cash flows of subsidized housing projects.

Table No. 1
SUBSIDIZED MARGINS OF FINANCING HOUSING PROGRAMS

Subsidized Housing Programs	The Principal		Subsidized Margins			
Program #1: Subsidized E	The Paid Amount					
Program #2: Subsidized E & D	The Paid Amount					
Program #3: Subsidized E , D, & C	The Paid Amount					
Program #4: Subsidized E, D, C, & B	The Paid Amount					
Program #5: Subsidized E, D, C, B, & A	The Paid Amount					
		A	B	C	D	E

A: part of the principal, B: Annual expenses C: Cost of the bad debt D: Cost of Capital
E: Inflation and devaluation of local currency

4. Investment Analysis of Subsidized Housing Means:

The possible means and channels of financing subsidized housing projects are different from one country to another and from one housing project to another. Many factors should be considered in preferring the services of one institution to another, factors such as the purposes of the housing programs, the economic ability and social class of

beneficiaries, and the desired extension of subsidized margin. Traditionally, public specialized institutions are the main means of financing subsidized housing, either through direct financing such as granting loans for beneficiaries, or through carrying out specific projects to build for distribution to the beneficiaries.

However, various institutions and means may be used to finance the subsidized housing projects in different countries and environments. These institutions may be classified into three groups as follows: First, public institutions such as public construction firms and municipalities. Second, cooperative institutions such as cooperative banks, cooperative construction firms and supplies cooperatives for building materials. Third, private business firms such as international and local construction firms and financial firms.

Examples of the above institutions are selected in this study in order to discuss the relevant capital investment techniques that may be considered in the financing of subsidized housing programs. Considering several basic criteria, including; assuring the continuity of the specialized institutions without exhausting any part of the principal funds, so that these funds can be rotated, keeping the cost of financing subsidized houses at a minimum rate, and maximizing the possible ranges of subsidized margin.

Land Development Authority for housing: One of the major obstacles of producing more housing units is the land in most of the counties. The land cost a substantial part of the total cost of a housing unit. The government may contribute to the housing sector by conducting specific projects to develop lands for housing in the major cities and suburbs so that selling would be based on cost rather than market price.

Various methods and models may be applied in order to develop the land such as site assembly model, real-estate takeover for renewal, developing new areas on government lands. However, the most relevant way to increase the areas for housing, according to developing countries is the development of new lands owned by the government. This may be accomplished by establishing the infrastructure for roads and utilities and by dividing to pieces based on relevant mapping and then selling for the beneficiaries in cash or in installments. The land Development Authority for housing may

be operated based on the following capital investment formula using the whole project basis rather than fiscal year basis:

Formula 1: The Present value of Cash inflow for a development land project (selling prices of the pieces of lands) ≥ present value of the cash outflows (nominal price of the government land + cost of infrastructure + administration expenses) discounted in a minimum rate to cover only the expected inflation rate.

The Public Housing Bank: The specialized housing bank is one of the most relevant channels, which may be used to finance subsidized housing in a developing environment. Such a bank concentrates on granting long-term loans directly for customers who are seeking to build their own houses and/or to finance buying new houses. In this regard, several options may be given to a public housing bank. For example;

First option: A bank with a portion of its assets to be invested in market securities while the remainder is allocated for housing loans, and having a public grant as owners equity may be operated according to the following:

Formula 2: The annual cash inflow for a fiscal year (collected installments) from previous loans + market securities returns ≥ the annual cash outflow (newly granted loans + bad loans and administrative expenses).

The above formula uses a fiscal year basis. The present value of cash flows, cost of capital and inflation rates are ignored as a way of subsidizing the housing sector.

Second option: A bank with all assets allocated for housing loans, having low interest liability loans, and a pubic grant as owners equity may be operated according to the following investment formula:

Formula 3: The annual cash inflow for a fiscal year (collected installments) ≥ the annual cash outflow (newly granted loans + annual cost of loans + bad loans + administrative expenses).

The Cooperative Housing Bank: A cooperative housing bank is an important channel of financing subsidized housing units. The cooperative housing bank deals only with housing cooperative societies. In most developing countries the housing cooperative sector represents a significant part of the total housing sector. The cooperative housing societies work and deal with the cooperative housing bank according to international and national cooperative principles and regulations. Accordingly, a cooperative housing bank with assets allocated for housing loans, liabilities which include current accounts for

cooperative societies and low-interest long-term loans, and members capital shares as owners equity may be operated according to the following:

Formula 4: Annual cash inflow for a fiscal year (collected installments) ≥ annual cash outflow (newly granted loans + bad loans + annual expenses + annual interest)+ 6% of capital shares value.

The above formula stated on a fiscal year basis and ignores the present value of cash flows and the inflation rate. However, if the present value of the cash flows should be considered the discount rate may be calculated as follows:

Formula 5: The discount rate = a percentage (1-2%) to cover annual expenses and bad loans + a percentage to cover the social cost (amount to be allocated for social services) + {interest liability rate X the ratio of long-term liabilities to total assets} + 6% X capital shares value ÷ total granted loans value.

The Supply Buying Cooperative for Building Materials: Obtaining the relevant building materials at fair prices is considered a significant problem facing the housing sector in developing countries, especially most of the housing units are constructed under the supervision of their owners and not by specialized construction companies. A family that wants to have a house has to hire many small contractors and supervise all processes of building the home, and it has to buy all of the relevant building materials from scattered market places. Therefore, establishing a supply cooperative for building materials is considered a significant means of financing subsidized housing units through offering the materials at low prices, in addition to many technical and construction services. The difference between the market price and the cooperative final price is considered to be the subsidized margin.

Formula 6: The net cash flow {sales- cost of goods sold - annual expenses} ≥ {6% of capital + 25% of income for reserves + 10% of income for social services} + the recovered price ratio {patronage dividends + annual sales}

The Local Construction Business Firm: a construction business firm may be used directly as a means to subsidize the housing sector. This is accomplished by offering the firm special subsidies, which will supposedly be passed on to the final beneficiaries. The special subsidy range from tax exemptions, importing privileges for building materials and

facilitation of credit including direct grants of free or low-interest loans. Granting low-interest loans to the specialized construction firms is a common mean of subsidizing business firms in serving the housing sector. However, governments and public institutions that grant such loans are expected to impose special conditions with regard to prices, cost and conditions of financing, and types of implemented housing units as well as the qualifications of the beneficiaries. In this case, the construction business firm may be operated according to the following:

Formula 7: The present value of cash inflows for all periods of the subsidized project ≥ present value of cash outflows discounted based on a reduced rate {cost of capital rate - the subsidized rate (the average market interest rate- the granted interest rate x percentage of the granted loan value to the total assets)}.

The International Construction Firm: Due to the lack of experience in construction as well as lack of needed equipment and building materials in most developing countries, international construction firms may be invited to participate in carrying out special housing projects. Then the question arises about the possibility of participating in implementation of the subsidized housing projects and dealing directly with final beneficiaries. In this case, formula No. 7 may be considered with adjustments related to the difference between international and local interest rates. Therefore, an international construction firm who receives subsidized loans may be operated according to the following:

Formula 8: The present value of cash inflows for all periods of a housing project ≥ present value of cash outflows discounted based on a reduced rate {expected rate of return from the related projects - the subsidized interest rate (international market interest rate - granted loan interest rate) X the ratio of the granted loan to the total investments for a project.

The Public Institution: Two groups of public institutions may be involved in subsidizing the housing sector: First, specialized public construction firms which are part of the public sector and are designated to build houses in order to resell or rent these houses to the individuals; and second, the public institutions such as municipalities and housing ministries. In case of a public construction firm, the investment formula may be as Follows:

Formula No. 9: The present value of cash inflows for the expected whole life of the firm ≥ the present value of outflows discounted based on a minimum rate including a percentage to cover expenses and bad loans + a percentage to cover the expected inflation rate.

The cost of capital rate as a part of the discount rate may be ignored as a part of the subsidized margin. In the case of the municipalities, the investment evaluation formula may be as follows:

Formula No. 10: The present value of cash inflows for all periods of a project ≥ cash outflows which are discounted based on a minimum rate including a percentage to cover housing project expenses, a part of the municipality expenditures and the expected inflation rate.

The Non-Profit Institution: Non-profit institutions such as social charities may be involved in subsidizing the housing sector, especially for low-income families and social welfare beneficiaries. These institutions may build special housing complexes through business construction firms in order to sell them at special prices to qualified beneficiaries under special programs. The subsidized margin, as the difference between market and special prices, may include the cost of financing and a part of the principal amount. In this case, the above special programs may be operated according to the following:
Formula No. 11: The total cash inflows for a program (collected installments + allocated subsidized funds) ≥ total cash outflows for the same program.

Finally, Table No. 2 summarizes the above-suggested institutions and their investment bases of financing the subsidized housing programs.

Table No. 2
THE RELEVANT INVESTMENT INSTITUTIONS AND THEIR INVESTMENT BASES FOR FINANCING SUBSIDIZED HOUSING

Institutions	Bases
Land Development Authority for Housing	* a project basis * prices based on cost rather than market
Housing Banks	* a fiscal year basis * subsidized margin includes a part of cost of capital
Cooperative Banks	* a fiscal year basis * subsidized margin includes a part of cost of capital * cooperative principles to be considered
Supply Cooperatives	* a fiscal year basis * the subsidized margin includes recovered price ratio (patronage) * cooperative principles to be considered

Local Construction Firms	* a project basic * the present value to be considered * subsidized margin includes low discount rate
International Construction Firms	* a project basic * present value to be considered * subsidized margin includes low discount rate (international rate-granted rate)
Public Institutions	* a whole life firm project basis * a zero net present value basis * subsidized margin includes cost of capital
Non-Profit Firms	* a project basis * subsidy margin includes cost of capital and a part of the principal * subsidized funds are exhausted

5. Summary and Conclusion

The financing of the housing sector has special characteristics, such as a long maturity, monthly repayment of the housing loans, and an increasing cost of the housing units. These characteristics significantly affect the amount of housing supply, which raises the final cost of housing to unaffordable level for many potential buyers. Therefore, countries all over the world try to subsidize the housing sector using various means. Direct allocated funds are one of the most commonly used means, especially to subsidize low-income family houses. However, the funds allocated for housing in a country fluctuate from one period to another and spent in most cases without considering the financial feasibility of such projects as long as the social targets are fulfilled.

Considering the experience of subsidized housing in Palestine, it may be concluded that the subsidized housing programs were not successful, they were costly, inefficient, and produced limited output as expressed by the number of built housing units compared to allocated funds for the subsidized programs. This apply for both methods of subsidies including direct grants and selling of finished units at subsidized prices.

Accordingly, and due to the new role of government in the economy, this is intended to present an investment analysis of the subsidized housing programs, in which several criteria have been considered, including: First; to assure the continuity of the related specialized institutions. Second; to prevent allocated principal funds from being exhausted, in order that the funds may be rotated for others beneficiaries. Third; to keep the cost of financing as a minimal as possible. Fourth; to maximize the subsidized margin.

Fifth; to use various methods and ranges of subsidized margins to fit all social classes of beneficiaries, the methods may be ranged from subsidizing a part of cost of financing to a part of the housing unit cost.

The subsidized housing programs may be offered through public firms, cooperative, local business and international business firms. Accordingly, the suggested investment formulas are relevant to the above institutions according to the purpose of the subsidized programs, and the available funds. Generally, a fiscal year basis formula is relevant to financial institutions, which are subsidized by public funds. A project basis formula using present value of cash flows is a relevant technique to be used by local and international construction firms, while a life project basis is a relevant technique to be considered by public construction firm. Finally, it should be noted that the suggested institutions and the investment formulas might be applicable to most developing countries in order to fulfill the social and economic objectives of subsidizing housing sector. However, differences concerning to the philosophy, objectives, related laws and regulations should be considered from one country to another in each of the above mentioned institutions.

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