
Buying a Real State Property Based on Two Possible Scenarios: Cash Payment and Payment by Installments. What's the Best Option?

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The following document presents a mathematical evaluation model applying two possible scenarios for the supposed acquisition of a property through a personal credit, with the purpose of knowing which is more convenient for the buyer: making a cash payment with a discount for prompt payment or making the purchase deferred in equal payments while generating a return through an investment instrument during the same period, thus assessing the results of both scenarios and the benefits that determine the best financial decision for the buyer.

Keywords: personal debt, cash payment, credit payment, investment, equal payments.

AMS: 97M30

JEL: G20, G22, G23

Introduction

Nowadays financial planning allows the assumption of the costs related to every purchase decision when acquiring more products or services, this in a conscious and responsible manner. However, in Mexico there are a million people that exceed the level of indebtedness in credit cards (Moreno, 2010), as well as in the personal loans that are given by bank and financial institutions in order to cover all those consumer's needs.

In recent years, non-performing loan portfolio it was of 2,500 million pesos in the year 2005 to 22,700 million pesos at the end of 2009. This is a clear result of the low financial education in our country, the economic crisis and the unemployment of the last decades (Moreno, 2010)

Based on data given until August, 2014, personal loans have increased in the latest years according to the Bank of Mexico (Banxico, 2015), meaning that "... the balance of personal loan rose to an annual real growth rate of 13.3 percent between 2012 and 2014. While in the year 2012 it represented only 17.8 percent of the consumer credit, in 2014 it was 19.7 percent of the total", which represents a 1.9 percent growth in personal loans.

With the information collected on the market regarding this kind of credit, each client has, on average, 1.5 credits. The clients with personal credits from banks related to a commercial chain (such as Banco Azteca and Banco Femsa, among others) report on average two credits for each customer. By contrast, the clients from banks without links to commercial chains have on average little more than 1 credit (Banxico, 2015).

Some advice provided by experts in personal finances include not having debts that exceed 40% of the income and to always liquidate more than the required minimal payment in order to avoid financial problems related to higher interest rates and commissions needed to pay for the credits.

However, studies by Cortez and Müller (2007) offer data showing that 60% of the credit card users only make the minimal payment since they do not have the sufficient economic capacity to pay the monthly interest rates, which can be high. In this way, making payments to credit cards and personal debts would only cover the minimal amount required to avoid a delay in the payments; still, the amount paid is insufficient and it will not show in the capital throughout time.

A recent research by Moreno-García, García-Santillán, Bermúdez and Almeida (2015) shows an approach to a hypothetical model of debt restructuring through different equivalent equations scenarios derived from the potential problem of little liquidity and the need to renegotiate the requested credit amount, thus achieving the new scheme for calculating the value of the debt.

With regard to this model, there is the dilemma of knowing the benefit of liquidating a debt in two different scenarios: making cash payment for the total amount or paying by installments while generating a return from such amount through an investment fund, so it is possible to know which is more convenient for the debtor.

Literature review

Companies draw upon long-term funding to acquire fixed assets and for its expansion, while short-term financing allows them to cover pending expenses or lack of cash flow and to make temporary investments. In order to obtain those funds, companies appeal to public and private banking loans or financial leasing (Morantes, 2003).

According to García-Santillán and Vega-Lebrúm (2008), another source of funding that has been around is the one provided by the suppliers, meaning the own providers of materials and supplies with whom the companies have direct dealings along their productive cycle.

The debt can be understood as the link through which the debtor and the creditor are related as a consequence of a buying and selling operation through credit or financing. The debtor is bound to pay the creditor the financed capital with the interest derived from the financial operation, this as a part of the agreement signed by them and also, the economic benefit is the object of the assumed obligation (Moreno, 2010;

García-Santillán and Vega-Lebrúm, 2008; García-Santillán, Venegas-Martínez and Escalera-Chávez, 2014).

In the following figures the elements of the debt are shown:

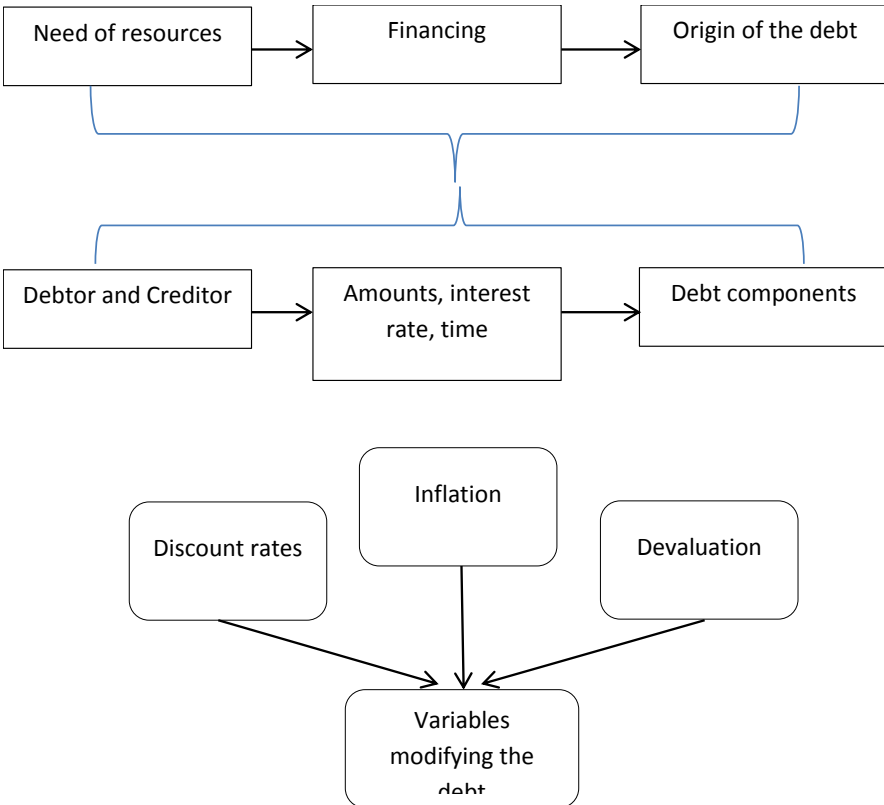


Figure 3. Variables that modify the debt (source: adapted from García-Santillán and Vega-Lebrúm (2008))

While it is true that a financing strategy is recommended to support the company's operation, at any given moment other variables must also be considered, such as: the financial situation of the company, the profit margins of the company and in parallel and the current interest rates at the moment of incurring debt, among other factors. A high level of indebtedness is appropriate only when the return rate of the total assets of the company is higher than the average cost of the capital. In other words, it is good that the company works with borrowed money as long as the net income is higher

than the interests that must be paid for that funded money (Mantuano, 2015).

According of the mathematical model proposed by Moreno-García, García-Santillán, Bermúdez and Almeida (2015), it is possible to see that in the case of debt restructuring, the creditor will necessary have a benefit in order to get an interest; however, the debtor will also win by getting a deferment in time, which allows a better management of cash flow, improvement of working capital management and creation of better solvency and liquidity indicators. With this considerations, a financial modeling is developed, which seeks to prove what is the better solution alternative for the hypothetical course that is analyzed and discussed in this research work.

Development of hypothetical scenario

Assuming that an investor decides to purchase a real state property to expand his business, the owner of such land gives him the option of cash payment or payment by installments. For this operation the following information is established: In cash payment there is a 2.3% discount over the total value of \$950,000.00 if paid in one single installment. For the credit operation, the amount will be paid off in 24 months at a 1.5% monthly interest rate over outstanding balance.

Scenarios

A. Cash payment

Assuming the cash payment is \$950,000 less 2.3% discount, then the investor will have to pay only \$928,150.00 in total for the land and saving \$21,850.00.

B. Payment by installments

Assuming that the purchase of the real state property that costs \$950,000.00 is made through payment by installments with an annual percentage ordinary rate of 17.5 %

From the formula:

$$NPV = R_p \left[\frac{1 - \left(1 + \frac{i}{m}\right)^{-n}}{i / m} \right]$$

Where:

NPV= Present Value of the Debt

R_p= Installment payment

i/m= Interest rate compounded

-n= Number of payments

Derive R_p from the original formula of NPV and we obtain:

$$R_p = \left[\frac{NPV}{\frac{1 - \left(1 + \frac{i}{m}\right)^{-n}}{i / m}} \right]$$

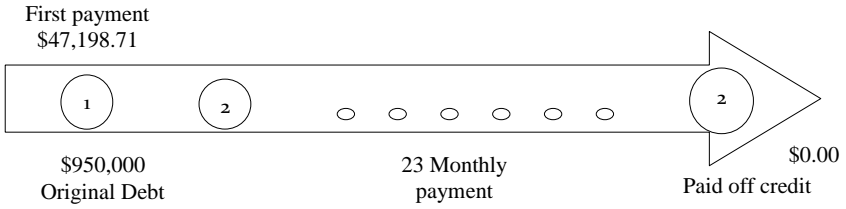
$$R_p = \left[\frac{\$950,000.00}{\frac{1 - \left(1 + \left(\frac{.175}{360} * 30\right)^{-24}\right)}{\left(\frac{.175}{360} * 30\right)}} \right]$$

$$R_p = \left[\frac{\$950,000.00}{\frac{1 - (1.014583333)^{-24}}{.014583333}} \right]$$

$$R_p = \left[\frac{\$950,000.00}{\frac{1 - (0.70647147)}{.014583333}} \right]$$

$$R_p = \frac{\$950,000.00}{\left[\frac{0.29352853}{.014583333} \right]} = \frac{\$950,000.00}{20.1276707} = \$47,198.71$$

In order to have a more illustrative approach to this scenario, the time line of the credit is presented next:



The time line shows that assuming the real state property is purchased by installment payments in 24 months, each payment will be of \$47,198.71 until the debt is paid off (see chart 1).

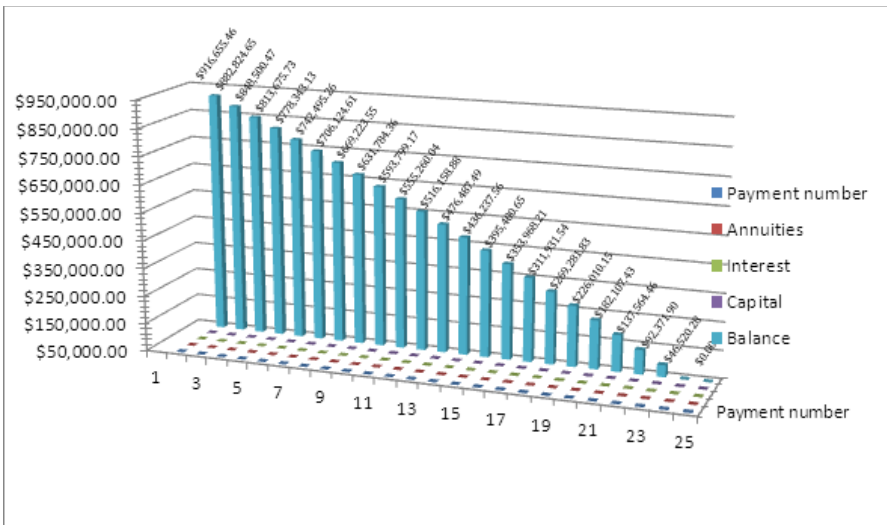
Table 1: Amortization of loan (annuity overdue)

Payment	Annuity	Interest	Capital	Balance
0				950,000.00
1	47,198.71	13,854.17	33,344.54	916,655.46
2	47,198.71	13,367.89	33,830.81	882,824.65
3	47,198.71	12,874.53	34,324.18	848,500.47
4	47,198.71	12,373.97	34,824.74	813,675.73
5	47,198.71	11,866.10	35,332.60	778,343.13
6	47,198.71	11,350.84	35,847.87	742,495.26
7	47,198.71	10,828.06	36,370.65	706,124.61
8	47,198.71	10,297.65	36,901.05	669,223.55
9	47,198.71	9,759.51	37,439.20	631,784.36
10	47,198.71	9,213.52	37,985.18	593,799.17
11	47,198.71	8,659.57	38,539.13	555,260.04
12	47,198.71	8,097.54	39,101.16	516,158.88
13	47,198.71	7,527.32	39,671.39	476,487.49
14	47,198.71	6,948.78	40,249.93	436,237.56
15	47,198.71	6,361.80	40,836.91	395,400.65
16	47,198.71	5,766.26	41,432.45	353,968.21
17	47,198.71	5,162.04	42,036.67	311,931.54
18	47,198.71	4,549.00	42,649.70	269,281.83
19	47,198.71	3,927.03	43,271.68	226,010.15

20	47,198.71	3,295.98	43,902.72	182,107.43	
21	47,198.71	2,655.73	44,542.97	137,564.46	
22	47,198.71	2,006.15	45,192.56	92,371.90	
23	47,198.71	1,347.09	45,851.62	46,520.28	
24	47,198.71	678.42	46,520.28	0.00	
		\$1,132,768.93	\$182,768.93	\$950,000.00	0.00

Source: own

Also, we can see graphically this scenario (Graph 1):



Graph 1: Composition of debt and its gradual reduction

Source: own

Graphic 1 shows visually the outstanding balance of each payment made monthly until the settlement of the debt in the installment number 24. At the end we can see that, the original debt would be paid, plus \$182,768.93 corresponding to the interest accrued by this loan.

Returning to Scenario A: Suppose that to purchase a real state property valued at \$ 950,000.00 the payment must be in cash. If instead of buying the property, this amount is invested for 24 months with the same interest rate. Which would be the result? Even, if they have not the total amount, but only carry out a deposit for \$47,198.71 in 24 monthly deposits. Which would be the result?

Case 1:

From the formula:

$$A_{ci} = P \left(1 + \frac{i}{360} * 30 \right)^{n/m}$$

Where: P= \$950,000.00 (principal), interest rate 4.7% (previously consulted in a bank), time 24 months (interest compounded $\frac{n}{m}$), $A_{ci} = ?$
Therefore, it is obtained that:

$$A_{ci} = P \left(1 + \frac{i}{360} * 30 \right)^{n/m} = 950,000.00 \left(1 + \frac{0.047}{360} * 30 \right)^{24/12}$$

$$A_{ci} = 950,000.00 (1 + [0.00391667])^{24} = 950,000.00 (1.00391667)^{24}$$

$$A_{ci} = 950,000.00 (1.09835806) = \$1'043,440.16$$

Case 2:

From the formula of the Amount of annuities anticipated:

$$A_A = A \left(1 + \frac{i}{m} \right)^1 \frac{\left(1 + \frac{i}{m} \right)^{n/m} - 1}{\frac{i}{m}}$$

Where: A= \$47,198.71 (principal), interest rate 4.7% (previously consulted in a bank), time 24 months (interest compounded $\frac{n}{m}$), $A_A = ?$

Therefore, it is obtained that:

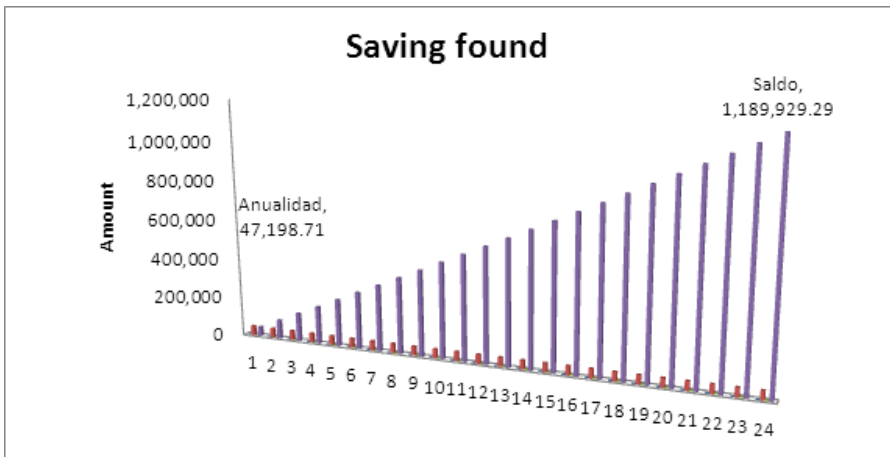
$$A_A = \$47,198.71 \left(1 + \frac{0.047}{360} * 30\right)^{30} \frac{\left(1 + \frac{0.047}{360} * 30\right)^{720/30} - 1}{\frac{0.047}{360} * 30}$$

$$A_A = \$47,198.71 (1.00391667)^{30} \frac{(1 + (.00391667))^{24} - 1}{.00391667}$$

$$A_A = \$47,198.71 (1.00391667)^{30} \frac{1.09835806 - 1}{.00391667} \quad A_A = \$47,198.71 (1.00391667)^{30} \frac{.09835806}{.00391667}$$

$$A_A = \$47,198.71 (1.00391667)^{30} (25.1126748) \quad A_A = \$47,198.71 (25.2110329)$$

$$A_A = \$1,189,928.23$$



Graph 2: Composition of saving fund
Source: own

Table 2: Saving fund (annuities anticipated)

Number	Annuities	Interest	Balance
1	47,198.71	184.86	47,383.57
2	47,198.71	370.45	94,952.73
3	47,198.71	556.76	142,708.20
4	47,198.71	743.80	190,650.71
5	47,198.71	931.58	238,781.00
6	47,198.71	1,120.09	287,099.79
7	47,198.71	1,309.34	335,607.84
8	47,198.71	1,499.33	384,305.88

9	47,198.71	1,690.06	433,194.65
10	47,198.71	1,881.54	482,274.90
11	47,198.71	2,073.77	531,547.38
12	47,198.71	2,266.76	581,012.84
13	47,198.71	2,460.50	630,672.05
14	47,198.71	2,654.99	680,525.75
15	47,198.71	2,850.25	730,574.72
16	47,198.71	3,046.28	780,819.71
17	47,198.71	3,243.07	831,261.49
18	47,198.71	3,440.64	881,900.83
19	47,198.71	3,638.97	932,738.52
20	47,198.71	3,838.09	983,775.31
21	47,198.71	4,037.98	1,035,012.01
22	47,198.71	4,238.66	1,086,449.37
23	47,198.71	4,440.12	1,138,088.21
24	47,198.71	4,642.37	1,189,929.29
\$1,132,769.04 \$57,160.25 \$1,189,929.29			

Source: own

Discussion of Results

For Case 1: In the assumption that the real state property is bought by cash payment there is a discount of 2.3% which represents \$21,850.00 of the total amount of \$950,000.00. Therefore, the investor will have to pay only \$928,150.00 for the real state property.

For case 2: If the payments are monthly during two years (24), at the end, in order to acquire the real state property the payment must be \$182,768.93 of interest + loan \$950,000.00 = \$1,132,768.93 total amount.

Otherwise, if the property is not acquired and instead an investment fund is created with monthly deposits of a similar amount that would pay the loan, \$47,198.71; How much money would be saved at the end of 2 years?

If 24 monthly deposits of \$47,198.71 are made, there is a savings of \$1,132,769.04, which would generate an interest of \$57,160.25 and the total would be \$1,189,929.29

Similarly, if the person that wants to purchase the real state has the money to make a cash payment but instead deposits the amount in an investment fund each month for the two years proposed in this calculations,

at the end of said time the amount of \$1'043,440.16 would be achieved, of which \$93,440.16 correspond to the interests earned.

Finally, it can be argued that all the options have advantages for anyone who wants to purchase a real state property, as long as the bank loan is acquired with a fixed interest rate which does not depend on the peso's parity with other currencies, the change of interest rates and the effect of inflation. Also, the purchase of a real state property leads to an increase in its value because of the capital gain acquired over time.

It is also important to mention that the cash (which would be used to purchase the real state property) can be invested in a savings fund that would pay dividends, although in the specific case of Mexico, the difference between the reference savings interest rate (called passive rate) and the reference credit interest rate (called active rate) is considerable since the active is higher than the passive, so that it is more convenient to purchase the real state property and over time, acquire value from the capital gain.

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