



CREDIT PURCHASE MODALITY THROUGH DENOMINATED SYSTEM CALLED "SMALL PAYMENTS". HOW DOES IT AFFECT DOMESTIC ECONOMY?

Researcher Vicky DIAZ-AQUINO¹, Researcher Arturo GARCIA-SANTILLAN¹,
PhD student Jéssica J. RAMOS-HERNÁNDEZ^{1*}, Researcher Génesis RIVERA-
NOVELO¹

^[1] UCC Business School at Universidad Cristóbal Colón, Carretera Veracruz-
Medellín S/N Boca del Río, Veracruz, México

Abstract

The aim of the study is to show, through three hypotheses supported by financial mathematical theory, how is the behavior of the Mexican household when making purchases of white goods. For this, an interest rate (i), the capitalization (m) and the time of the debt (n) are established according to each departmental store included in this study; all this to be able to compare through amortization tables how are the payments. The results are compared in order to show and identify the effect that credit purchases have with the called "small payment schemes" for the Mexican household. The benefit of this analysis is to show the possibility for Mexican families of discerning the most convenient option when acquiring this sort of assets so that they are really capable of paying on time.

Keyword: credit payment, loan bank, white goods, Mexican household economy.

JEL Classification: G10, G20

I. Introduction

In the Mexican context, the industry of department stores with national prestige which are part of "white goods" chain stores keep developing marketing strategies to sell

*Corresponding author: Jéssica J. RAMOS-HERNANDEZ, E-mail: jes.jrh@gmail.com



their products using credit; these stores have the modality of cash payment with respective benefits but credit is still the advertising strategy for this industry.

The success attained by applying the credit strategy has led the retail business to make agreements with banking institutions in order to sell in payment plans, with fixed interest, later payment or no interest with credit cards. The former has been a benefit for credit institutions since they have been able to attract a new audience who has visualized the possibility of acquiring material assets using this means. This offer has been called “Small payment scheme” in Mexico.

This scheme seems to be attractive for Mexican consumers, as they are able to participate in such offers, considering that the average income of Mexican households is not enough to destine a specific budget for cash purchases.

According to the average prices on the National Index of Prices to the Consumer (INPC for its acronym in Spanish) published by the National Statistics and Geography Institute (INEGI for its acronym in Spanish), domestic accessories for Mexican households cost around \$5,243.01 Mexican pesos; while on January 1st, 2016, the general minimum wage was established in the amount of \$80.04 Mexican pesos per day, as published by the Service Tax Administration of Mexico (SAT, 2017). Also, it is necessary to add that the average income of Mexican households spend approximately 8.9% in items for the house, thus, leading us to think that the income of a Mexican family under this conditions seems deteriorated (INEGI, 2016).

Therefore, this financial and marketing strategy called “small payments scheme” has been successful in the Mexican context, due to the fact that it seems to have a direct impact in the minds of families, or at least in the people who make the decisions in the sales point. Lindstrom (2010), who has dedicated to the study of consumer’s behavior at the sales point, mentions that when we place a brand to things, our minds perceive them as more special and with a higher value than it actually is.

The advantage of buying a household item under the “small payments scheme” against cash payment is the immediate expenditure of cash, which makes this strategy to be met with great acceptance among Mexican consumers, given that it seems to be better to expend cash in a leisurely and periodic manner for the acquisition of material assets.

Further than seeking to explore the effects that may be produced by a commercialization strategy on the decision making of acquiring a product or service by the client, this study only aims to determine from mathematical scenarios, which would be the best possible option, whether it is cash payment or credit, in order to identify possible



benefits or, in any case, the corresponding financial costs that arise from a credit scheme in the “small payments” modality or interest-free monthly payments, among others.

Understanding the consumerism system and globalization that permeates the purchasing behavior of people around the world, it is natural to comprehend that human beings need to keep buying things, acquiring assets that improve their status within the society where they belong, that is, to have that belonging sense Adam Smith –considered by many as the father of Economy- spoke about. This fact makes possible to understand the permanence that a strategy of small payments in installments has had and which has been made a common practice among consumers.

It is clear that this sales strategy has caused the consumer to not having finished paying a purchase in said modality when he/she is making the decision of acquiring another asset or service using credit, immersing over and over again in each offer or credit festival that retail stores use to commercialize new products, new technologies and new solutions for the house.

Because of the former, the aim of this research is to prove if acquiring assets using small credit payments, affects the family’s economy or not.

II. Literature review

In a study carried out by Clavellina-Miller (2013), he explains the situation that has been brought in Mexico by the entrance of foreign companies to commercial banking and how this has affected the economy of Mexican families. According to the author, this state of affairs has been largely caused by the market power of the financial institutions that offer credit. The high costs that users of the financial system need to pay when using credit come with very high active rates.

This author also dedicates a paragraph to asset consumption, to which a larger amount of interested is added when they are acquired by credit and that is more profitable to the bank that provides the credit resources, while to the user it is more burdensome to acquire these household items.

Regarding the ethical consumption in the purchase of assets and services, the social affectation of belonging in which different people follow ethical consumption patterns without defining their own, reinforces the purchase need of the consumer in order to fit in the society where they belong (Starr, 2015).

Analyzing the indebtedness of Mexican households means to understand social reasons, marketing effects and mostly, the lack of household budget planning, which will



have serious repercussions in Mexican economy if not addressed appropriately before having a consumer who is indebted for life.

These arguments are valid for a deep analysis of this phenomenon, even though this work seeks to financially model some possible scenarios that allow identifying the best option for the acquisition of “white goods” for the house. Hence, the research continues next as follows:

III. Methodology

III.1 Development of hypothetical case

In order to visualize mathematically the possible disadvantages that a credit system in Small installments has, it is necessary to pose a financial scheme where it is possible to carry out a mathematical model that allows the contrasting of hypothetical scenarios in order to identify similarities, differences and corresponding benefits or downsizes to the consumer’s income by using the Small payments modality in installments.

The credit system in installments and with Small payments induces the consumer of credit card holder who acquires an asset to be permanently in the client portfolio of banking institutions; the former, also leads to the payment of interests over interests caused by the effect of capitalization (García-Santillán, 2014); furthermore, while the credit is valid and if the purchase was made with the credit card, he/she will be subjected to the yearly fee charged by the bank for the use and possession of the credit card. The former provides a profit for the bank and for the department store that sells the items, but it is in direct detriment of the budget and economy of the consumer.

III.2 Field research

In order to contextualize the possible damage to the income of a family who purchases an asset or service by using the credit system of Small payments in installments, also known as “Small payments scheme”, a field research was carried out beforehand in order to obtain information for the financial modeling. Therefore, visits were made to the following commercial establishments:

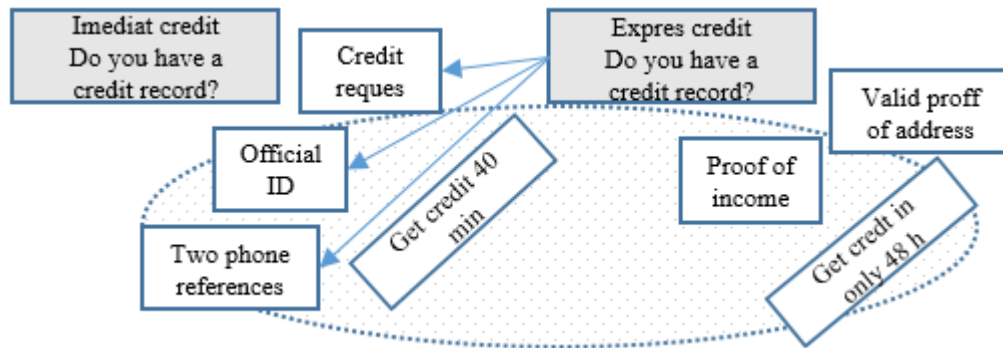
FotoContino de Veracruz, S. A. de C. V.

Founded on October 15th, 1966. The first branch was established in the avenue Independencia in the city of Veracruz, where up to date continues to operate. The branch offices visited for this field study was located on: Plaza Cristal, 3.7 Km., DíazMirón S/N,



Colonia del Maestro. “SistemasContino” has its own credit card called “Credicontino”, which provides two ways to acquire it:

Figure 1 - Two ways to acquire an “Credicontino”



Source: own elaboration

In the afore-mentioned branch the acquisition of a household item such as a fridge, washing machine and stove were investigated, along with the different forms of payment and the advantages of buying with the different offers.

Table 1 shows how the payments scheme is if the item is bought with the credit from Contino S.A. de C.V.:

Table 1- Payment schemes for a household item by using the credit from “Contino ”

Item	Regular Price in cash payment	Discounted Price in cash payment	Total Price in credit	Without deposit (Months)	Monthly cost	Total amount paid
Fridge Mabe 11"	\$7,649.00	\$6,498.00	\$8,124.00	6	\$1,354.00	\$8,124.00
Washing machine Easy 16 kg.	\$6,829.00	\$5,799.00	\$7,249.00	6	\$1,209.00	\$7,254.00
Stove Mabe 20"	\$4,359.00	\$3,699.00	\$4,624.00	6	\$771.00	\$4,626.00

Source: own processing with data obtained in department stores



Along those lines, in Table 2 presents the payment scheme if the purchase of the item is made using a credit card that participates in the sale promotion and is external to “Contino”.

Table 2- Payment scheme using a credit card that participates in the sale promotion external to “Contino”

Item	Credit card price	Installments	Amount	Total
Fridge Mabe 11"	\$7,649.00	12	\$637.42	\$7,649.04
Washing machine Easy 16 kg.	\$6,829.00	12	\$569.08	\$6,828.96
Stove Mabe 20"	\$4,359.00	12	\$363.25	\$4,359.00

Source: own (with data obtained in department stores)

As it can be seen on Tables 1 and 2, the difference is minimal in both scenarios, it will all depend on the price, number of installments and the credit on which the store is based and finally, the client will make the decision. Also, as part of the inquiry, the staff who attended our request was asked about the interest rate that will be paid in such operations, receiving a negative answer, whether it is for lack of knowledge or for not being authorized to provide such information to the client, which we believe, should not happen. However, the same person in charge of providing the information used in the calculations, hinted that the option that was better for the customer was the payment with a credit card that participates in the sale promotion.

Coppel

It is a Mexican Company with headquarters in Culiacán and was founded on 1941. It is a commercial chain of sales department stores that uses financing and credit with few requirements and free delivery.

During the field research, when information was asked for, the personnel who attended our request commented that in order to provide information about commercial operations to acquire “white goods” or home appliances, it was necessary to apply for the department store credit card, or when paying with a credit card from a bank, otherwise, they could not provide the requested information. Thus, with the intention of obtaining the prices for the home appliances, we resorted to the catalog offered by the store and with that



information, calculation were made from the installments offered by the store. On table 3, the data derived from the financial modeling is presented.

Table 3- Payment schemes for a household item by the payment catalog using the credit from “Coppel”

Item	Price	In cash	15 days periods	Months	Amount	Total amount to pay
Fridge Mabe 11" Initial payment: \$650.00	\$7,299.00	\$6,499.00	48		\$199.00	\$10,202.00
				12	\$640.00	\$8,830.00
				24	\$398.00	\$10,202.00
Washing machine Easy 16 kg. Initial payment: \$600.00	\$8,899.00	\$5,999.00	48			\$184.00
				12	12	\$592.00
				24	24	\$368.00
Stove Mabe 20"Initial payment: \$400.00	\$4,499.00	\$3,999.00	36		\$148.00	\$5,728.00
				12	\$396.00	\$5,152.00
				18	\$296.00	\$5,728.00

Source: own (with data obtained in department stores)

From the comparison of the amounts describe don table 3, it is observed that payments done every 15 days, the amounts are the same to be paid if the deadline is set in 24 months. Certainly, the amount is higher against the payment done in 12 months for the effect of capitalization, since it decreases for 12 months as it increases for 24 months. The important thing here is to show the existing options of how it can acquire this “white good” or home appliance.

El Puerto de Liverpool S.A.B. de C.V.

It is a Mexican Company that operates department stores aimed to the medium and high income consumers and whose headquarters are in Mexico City; its core business is operating in Mexico the department stores Liverpool and Fábricas de Francia, as well as the newly acquired, Suburbia. Also, it offers credit through Liverpool credit cards and receives income for the lease of space in malls. It is the second company with higher sales in the department store industry in Mexico.

For the purpose of comparing the total amount to be paid using the installments offered by Liverpool for the several items, the corresponding calculations were made as shown on table 4, where it is possible to see the total amount, including the discount offered



by the store and as relevant information about the payment, it will be made in monthly installments without interest.

Table 4- Payment scheme for a household item offered by Liverpool

Item	Regular price	% of Discount	Price with discount	No-interest monthly payments	Amount	Total amount to pay
Fridge Mabe 11"	\$10,099.00	25%	7,574.25	9	\$841.58	\$7,574.22
Washing machine Easy 16 kg.	\$8,999.00	15%	7,649.15	9	\$849.90	\$7,649.10
Stove Mabe 20"	\$9,299.00	27.75%	6,718.52	9	\$746.50	\$6,718.50

Source: own (with data obtained in department stores)

III.3 Hypothetical assumption

We assume that, according to the context where this research is been made about the purchase of home appliances, the payment scheme known as “Small payments” directly affects the payment of interests because of the financing or credit given, this derived from the capitalization effect, meaning that if the small payments in a period are done weekly or every 15 days, the interest payment is higher than if the payments were done monthly.

III.4 Development of the study case

To calculate the amount of the payments in the scenarios that are modeled financially, we follow the procedure posed by García-Santillán (2014), about the methodology that calculates the present value payments under a scheme of ordinary annuity. This, due to the fact that the credit system of payments (small ones) Works under said methodology and it is represented with the following formula:

<p>From the formula</p> $NPV = P_{p1} \left[\frac{1 - \left(1 + \left(\frac{i}{365 - \acute{o} - 360} * m\right)^{-n/m}\right)}{\frac{i}{365 - \acute{o} - 360} * m} \right]$	<p>If we want to know the amount of each fee so, we should derive from the formula P_{p1} :</p> $P_{p1} = \left[\frac{NPV}{\frac{1 - \left(1 + \left(\frac{i}{365 - \acute{o} - 360} * m\right)^{-n/m}\right)}{\frac{i}{365 - \acute{o} - 360} * m}} \right]$
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Where:

NPV- Net present value or value of the white good which is acquirement

n- number of payments

i- interest rate compounded (ordinary “360” or accurate “365” interest rate)

Pp1= periodical payment 1

m- capitalization (compounded interest-anatocism [1])

To corroborate this assumption, we will apply said formula in three different scenarios. The idea is to financially model each case in order to identify the best option to purchase the “white good” and specially, to determine the amount paid as interests caused by the capitalization effect and if this increases as the number of installments is reduced in time, that is, the Small payments modality.

Scenario 1. Under the assumption that one wishes to buy three “white goods” or home appliances (a fridge, a washing machine and a stove seen on Table 5), using the payment scheme with the Contino credit. The total amount of the operation for the three items is \$15,996.00, which is paid in 6 equal installments of \$3,332.83 with a monthly interest rate of 6.77708%. Now, the question is which is the total amount to be paid at the end of the credit?

Table 5- Acquisition of “white goods”

Item	Amount	Monthly payment
Fridge	\$ 6,498.00	\$1,354.00
Washing machine	\$ 5,799.00	\$1,208.17
Stove	\$ 3,699.00	\$770.67
Debt amount	\$15,996.00	\$ 3,332.84

Source: own (with data obtained in department stores)

Where:

VPN =?; $Rp1 = \$3,332.84$; $i = 6.77708\%$; $n = 6$ months; $m =$ monthly

Formula

$$NPV = P_{p1} \left[\frac{1 - \left(1 + \left(\frac{i}{365 - \acute{o} - 360} * m\right)^{-(n/m)}\right)}{\frac{i}{365 - \acute{o} - 360} * m} \right]$$

$$VPN = \$3,332.84 \left[\frac{1 - (1 + .00677708)^6}{0.00677708} \right], VPN = \$3,332.84 \left[\frac{0.03971514}{0.00677708} \right]$$

$$VPN = \$3,332.84 (5.8602146), VPN = \$19,531.16$$



Corroboration

$$P_{p1} = \left[\frac{NPV}{\frac{i}{365 - \acute{o} - 360} * m} \right] \left[\frac{1 - \left(\frac{i}{365 - \acute{o} - 360} * m \right)^{-n/m}}{0.00677708} \right] Rp = \left[\frac{\$19,531.16}{0.00677708} \right], Rp = \left[\frac{\$19,531.16}{0.0397151} \right]$$

$$Rp = \frac{\$19,531.16}{5.86021464}, Rp = \$3,332.84$$

Table 6- Amortizations

Month	Initial balance	Interest	Final balance	Payments	Balance after payment
0					\$15,996.00
1	\$15,996.00	\$1,084.06	\$17,080.06	\$3,332.83	\$13,747.23
2	\$13,747.23	\$931.66	\$14,678.89	\$3,332.83	\$11,346.06
3	\$11,346.06	\$768.93	\$12,114.99	\$3,332.83	\$8,782.15
4	\$8,782.15	\$595.17	\$9,377.33	\$3,332.83	\$6,044.49
5	\$6,044.49	\$409.64	\$6,454.13	\$3,332.83	\$3,121.30
6	\$3,121.30	\$211.53	\$3,332.83	\$3,332.83	\$0.00
		\$4,000.99		\$19,996.98	\$0.00

Source: own processing with data obtained in department stores

In Table 6, the values obtained from the amortization are presented and we can see that in order to settle the debt, the amount to be paid is \$19,996.98 and considering that the initial debt was \$15,996.00, the amount of \$4,000.99 will be paid for interest, which is approximately 25% for the concept of financing of credit interest.

Scenario 2. Considering the same “white goods”, the total amount of the operation is \$16,497.00 to be covered in 12 equal installments of \$1,807.17 with a monthly interest rate of 4.48070% with Coppel Credit. Which would be the total amount to pay at the end of the credit?



Table 7- Amortizations

Item	Amount	Monthly payment
Fridge	\$7,299.00	\$735.83
Washing machine	\$5,999.00	\$642.00
Stove	\$3,999.00	\$429.33
Debt amount	\$15,996.00	\$1,807.16

Source: own processing with data obtained in department stores

Where:

VPN =?; Rp1 = \$1,807.16; i = 4.48070%; n = 12 months; m = monthly

Formula

$$NPV = P_{p1} \left[\frac{1 - \left(1 + \left(\frac{i}{365 - \acute{o} - 360} * m\right)^{-n/m}\right)}{\frac{i}{365 - \acute{o} - 360} * m} \right]$$

$$VPN = \$1,807.16 \left[\frac{1 - (1 + 0.0048070)^{-12}}{0.0048070} \right], VPN = \$1,807.16 \left[\frac{0.0559213}{0.0048070} \right]$$

$$VPN = \$1,807.16 (11.6333056), VPN = \$21,023.24$$

Corroboration

$$P_{p1} = \left[\frac{NPV}{1 - \left(1 + \left(\frac{i}{365 - \acute{o} - 360} * m\right)^{-n/m}\right)} \right]$$

$$Rp = \frac{\$21,023.24}{\left[\frac{1 - (1.0048070)^{-12}}{0.0048070} \right]}, Rp = \frac{\$21,023.24}{\left[\frac{0.0559213}{0.0048070} \right]}$$

$$Rp = \frac{\$19,531.16}{11.6333056}, Rp = \$1,807.16$$

Table 8- Amortizations

Month	Initial balance	Interest	Final balance	Payments	Balance after payment
0					\$16,497.00
1	\$16,497.00	\$739.18	\$17,236.18	\$1,807.17	\$15,429.02
2	\$15,429.02	\$691.33	\$16,120.34	\$1,807.17	\$14,313.18
3	\$14,313.18	\$641.33	\$14,954.51	\$1,807.17	\$13,147.34
4	\$13,147.34	\$589.09	\$13,736.44	\$1,807.17	\$11,929.27
5	\$11,929.27	\$534.52	\$12,463.78	\$1,807.17	\$10,656.62
6	\$10,656.62	\$477.49	\$11,134.11	\$1,807.17	\$9,326.94
7	\$9,326.94	\$417.91	\$9,744.85	\$1,807.17	\$7,937.69



Table 8- Cont.

Month	Initial balance	Interest	Final balance	Payments	Balance after payment
8	\$7,937.69	\$355.66	\$8,293.35	\$1,807.17	\$6,486.19
9	\$6,486.19	\$290.63	\$6,776.81	\$1,807.17	\$4,969.65
10	\$4,969.65	\$222.68	\$5,192.32	\$1,807.17	\$3,385.15
11	\$3,385.15	\$151.68	\$3,536.83	\$1,807.17	\$1,729.67
12	\$1,729.67	\$77.50	\$1,807.17	\$1,807.17	\$0.00
		\$5,189.00		\$21,686.04	

Source: own (with data obtained in department stores)

Table 8 presents the values obtained in the amortization, where it is possible to observe that in order to liquidate the debt, the total amount of \$21,686.00 must be paid, to which if we subtract the initial debt of \$15,996.00 the additional amount of \$5,189.00 will be paid, which is approximately 23.93% in interests.

Scenario 3. For the financial modeling there was not a charged interest rate since the acquisition is offered in monthly installments without interest. The “white goods” have a discount on the regular price and on said Price, the sale promotion of monthly payments without interest is provided. Certainly, it seems attractive at a first glance, but it is a strategy designed to keep them captive as customers and keep offering more sales promotions that may result interesting for the clients. Likewise, the reference items already include a profit percentage in the Price that is being offered with the promotion. We should also take into account that department stores handle very precise policies regarding inventory turnover, since the products that are being offered are usually season products, hence the need to keep moving the goods, which is the reason why this sort of sales promotions are a good ally to reach said goal. On Table 9, the unitary values by product are shown as well as the financial run on Table 10.

Table 9- Amortizations

Item	Amount	Monthly payment
Fridge	\$7,574.25	\$841.58
Washing machine	\$7,649.15	\$849.90
Stove	\$6,718.52	\$746.50
Debt amount	\$21,941.92	\$2,437.98

Source: own (with data obtained in department stores)



Table 10- Amortizations

Month	Initial balance	Interest	Final balance	Payments	Balance after payment
0					\$21,941.82
1	\$21,941.82	0	\$21,941.82	\$2,437.98	\$19,503.84
2	\$19,503.84	0	\$19,503.84	\$2,437.98	\$17,065.86
3	\$17,065.86	0	\$17,065.86	\$2,437.98	\$14,627.88
4	\$14,627.88	0	\$14,627.88	\$2,437.98	\$12,189.90
5	\$12,189.90	0	\$12,189.90	\$2,437.98	\$9,751.92
6	\$9,751.92	0	\$9,751.92	\$2,437.98	\$7,313.94
7	\$7,313.94	0	\$7,313.94	\$2,437.98	\$4,875.96
8	\$4,875.96	0	\$4,875.96	\$2,437.98	\$2,437.98
9	\$2,437.98	0	\$2,437.98	\$2,437.98	\$0.00
		\$0.00		\$21,686.04	

Source: own processing with data obtained in department stores

IV. Conclusion

The purchase of goods and services through bank credits or department store's offers is an option when a person cannot pay for a product using cash. This method implies that the total cost of the product will be divided in partial payments, which can be weekly, every 15 days or monthly, plus an interest rate associated to the offered credit.

In this research, the acquisition of "white goods" in three different department stores was proposed, showing three scenarios, where Financial Mathematics theory sustained the final amounts that a Mexican family must pay at the end when acquiring a "white good".

Each scenario and each department store, according to their interest rate and credit, presents advantages and disadvantages that sometimes, cannot be clearly seen by the consumer, which is why this paper aimed to show, in a more noticeable manner, the comparison between one another.

According to the amortization tables, it is shown how on the department store from scenario 1, a 25% is being added to the original amount. In scenario 2, a 31% is paid in addition to the original amount. Scenario 3 is different from the first two stores, showing how a discount is offered if the good is acquired with the store credit and with the discount offered in the sale promotion.



Comparing the three scenarios, the first two show that an excessive value is paid at the end, while in the third scenario the opposite is proven, the store benefits the consumer with an offer to acquire the same items compared in this research.

The former proves that the average minimum wage earned by a Mexican family cannot sustain the acquisition of assets in cash and must therefore, appeal to a bank credit which in the end, only jeopardizes their economic health due to the fact that there are larger basic needs that must be covered daily, such as food, education or health, to name a few examples. However, acquiring debts that are only prejudicial can cause a crisis in the future a crisis for a country.

If the asset is really an item needed in the household, other acquisition options or payment schemes with a longer or shorter term must be explored and also, how the final amount would change; it is only possible to know the benefits and drawbacks of the different market options when each department store offer is compared and contrasted.

It is possible to see that in practice, when people make a purchase of a “white good” and pay it on installments, they only believe that the product cost is divided throughout time and do not take into account that this entails the payment of an interest rate, which can be obtained if all the payments required to pay for the item are added and that amount is contrasted with the item price when it is paid in cash.

Nonetheless, the item cost in cash is paid when an item is bought in installments that are truly without interests, but in this case, the profit for the department store or banking institution is having a captive customer, who can buy other products and sometimes, must pay a yearly fee as payment for the use of their credit card.

The purpose of this work was being able to carry out an analysis from an economic perspective of the different options that can be found in the market for the purchase of “white goods” in daily life and showing the possibility of analyzing each of the financing options.

The benefit of making this kind of analysis is that it shows the possibility for Mexican families of discerning the most convenient option when acquiring this sort of assets, according to income and economic possibilities, in such a way that they can choose a payment scheme that they are really capable of covering and paying on time.

This approach to the purchase of items can be applied in different situations of daily life, when it is necessary to buy items that are off the established Budget expense and therefore, it can become a useful and applicable tool for Mexican households that allows them to know the advantages and disadvantages of their purchase decisions and thus, choose the best option for their financial wellbeing.



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Others notes

[1] About anaticism, we may understand as the effect of capitalization of the interest on interest by the borrowed amount as stated García-Santillán, Ortigosa, Hernández, Mora & Ramos-Hernández, (2016).

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