



Cooperative ethical banking: An analysis of innovative loan transaction of JAK Medlemsbank

Banca ética cooperativa: un análisis de las innovadoras operaciones de amortización de JAK Medlemsbank

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Abstract

This article studies, from a financial point of view, the operation of the deposit and credit system in the Swedish ethical cooperative JAK, calculating the real effective cost of a loan transaction. The results show that the original model of this self-denominated “interest-free bank” really involves to the borrower a real effective cost. Furthermore, it shows how, in normal circumstances, this cost is fast higher than average cost offered by traditional banks. This fact is due to JAK requires a higher non-remunerated deposit, because of both the application of a reducing coefficient and the same term to the loan granted. Consequently, this kind of bank it is not attractive. However, when the social benefits are considered, as well as the possibility of obtaining loan rights to other members, its utility is considerable from an social and economic and point of view, due to the low effective cost of the operation.

JEL code: G21, D14, G29

Keywords: Ethical banking; Interest rate; Loan transactions; Savings operations

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Resumen

Este trabajo estudia, desde un punto de vista financiero, el funcionamiento del sistema de depósitos y de créditos en la cooperativa bancaria ética sueca JAK, calculando cuál es el coste efectivo real de una operación de préstamo. Los resultados ponen de manifiesto que el original modelo de esta auto-denominada “banca libre de interés” sí supone en realidad para el prestatario un coste efectivo real en sus préstamos. Además, se muestra cómo, en circunstancias normales, este coste es muy superior al promedio del coste ofertado por los bancos tradicionales. Ello es debido a que JAK exige un depósito no remunerado de cuantía superior, debido a la aplicación de un coeficiente reductor, e igual plazo al del préstamo concedido. En consecuencia, considerando solamente criterios económicos personales, este tipo de banca no resulta atractiva. No obstante, si se tienen en cuenta los beneficios sociales, así como la posibilidad de ceder derechos de préstamo (puntos de ahorro positivos) a otros miembros, entonces su utilidad es considerable desde un punto de vista económico, por el bajo coste efectivo de la operación, y social.

Código JEL: G21,D14 ,G29

Palabras clave: Banca ética; Tipo de interés; Operaciones de préstamo; Operaciones de ahorro

Introduction

Ethical banking, in the context of developed countries, is a model that has aroused growing interest since the global financial crisis of 2007, which led to consider money as an instrument that connects with the real productive economy, rather than just a simple speculative resource. Similarly, as opposed to traditional banking with a purely economic ideology, the value of social and ethical ideology in the banking system arises (Cowton, 2002; Edery, 2006; Palazzo & Rethel, 2008; San-José, 2009; Soler & Melián, 2012).

It is generally accepted that ethical banking is a group of entities that offer financial products that, in addition to creating economic value, provide value for society as a whole or in a localized manner for regional economies that they intend to help develop. One of its main characteristics is transparency with its customers, defining at all times the type of financial operations that are carried out, and avoiding those that involve unethical or unsympathetic behavior (Alejos Góngora, 2014; Ochoa Berganza, 2013). Thus, one of the key factors of this type of banking is that it is capable of communicating its responsibility in the capturing and distribution of funds, meaning: what does it represent? And what type of investments can it make (Harvey, 1995)?

The study on the basic characteristics, the principles, and the minimum conditions required to speak of ethical banking has been specifically considered (Cabaleiro Casal & Rodríguez Parada, 2008). Similarly, in the last few years, authors and researchers have become aware of the importance of the study of the particular cases of the same (Condosta, 2012; Sasia Santos, 2012; Tormo & Navarro, 2012; Carrie, 2001).

On the other hand, research has been carried out on socially responsible investment (Ferruz Agudo & Corral Orea, 2015; Ochoa Berganza, 2013), as well as on corporate social responsibility and its relationship with ethical banking (Pérez-Ruiz & Rodríguez del Bosque, 2012; Cuesta González, 2006). However, traditional banks are not transformed into ethical banks simply because they incorporate social and ethical aspects through corporate social responsibility (San-Jose, Retolaza, & Gutierrez-Goiria, 2011). Ethical banks are a part of what is called social banking and they are those banks that operate in developed countries, representing an alternative for customers who demand responsibility from their financial institution and the assurance that their savings have a destination consistent with their own ethics. The other part of social banking is made up of poverty-reduction banks operating in underdeveloped countries, and are normally linked to microcredit institutions (Soler Tormo & Melián Navarro, 2012). Granting credit to the poor was a revolutionary action in conventional economic thought, since it implied ignoring the traditional belief of not granting credit to those without guarantors. This premise, held by most of the banking system, leaves half of the population out of the financial system, as it is considered unworthy to participate in it (Yunus, 2008).

Cooperative banking has a philosophy that is close, at least in its origins, to ethical banking: the financial inclusion of vulnerable groups and the application of ethical, solidary, and responsible principles. In this sense, it is interesting to note how cooperative banking in the United Kingdom has contributed to the development of environmental practices, prioritizing these in its transactions and not only maximizing profit, which has earned it great recognition, so much so that large banks are incorporating these practices to safeguard their corporate image in the community (Cheong Cheow, Hong Tan, & Rizal Hamid, 2016). However, although the objectives of cooperative banking and commercial banking are different, both exhibit the same behavior towards credit rationing and attitude towards risky projects (Becchetti, Garcia, & Trovato, 2011).

To speak of ethical banking it is necessary to reference Islamic banking, based on the prohibition of *riba* (unfair gain) established by the Quran, so that the interest on loans is replaced by the participation in the profits/losses that the financed project generates. In this sense, the investments financed with the loans granted are supervised by the bank, which implies less failure of these projects, since the borrowers have specialized advice. With regard to savings, the alternative offered is interest-bearing deposits in the form of a *hiba* (gift), that is, a variable

return that depends on the investments made by the bank (Cervera Ruíz, 2009). On the other hand, Islamic banking is transparent and just in its transactions, both characteristics imposed by the external regulation in traditional banking (Haron, 2004).

There is a positive relation between economic growth, which is reflected on variables such as GDP or foreign investment, and the development of traditional banking. A similar situation takes place in Islamic banking, especially in countries with a higher income (Ahmad, Yazis, & Oudat, 2015). There is also no difference in profitability between the two, measured in terms of ROA and ROE; however, Islamic banking has more liquidity, less risk, and more solvency than traditional banking (Samad & Hassan, 1999). In general, the ethical approach does not significantly affect the profitability of this type of banking (Halamka & Teplý, 2017).

In the last three decades of the last century most ethical banks began to be created, such as South Shore Bank in the United States (1973), Triodos Bank in Holland (1980), The Co-operative Bank in England (1992), *Banca Popolare Etica* in Italy (1995), and JAK Medlemsbank (hereinafter JAK) created from a financial cooperative founded in 1965 in Skövde, Sweden, and operating as a full bank since 1997.

JAK is only firmly established in Sweden and Denmark, but its model is beginning to be applied in other European countries such as Finland, Norway, Germany, and Italy. Likewise, there is an association in Spain that is analyzing the viability of its implementation. The philosophy of JAK is based on three fundamental pillars: absence of explicit interest, both in asset and liability transactions; democracy and participation, in the sense that all clients are in turn owners of the entity and actively participate in management decision-making; and, finally, co-education, meaning that it is the client-owners themselves who expand the idea of the entity in order to make it grow.

The absence of explicit interest advocated by JAK has earned it a comparison with Islamic banking. However, there are notable differences between the two financial models (Hyder, 2013). Namely, in Islamic banking the ownership belongs to the shareholders, who provide the capital necessary for the operation of the bank; the entity participates in the profits or losses generated in the projects it finances, in addition to carrying out many joint venture and leasing operations; its foundation is religious; the means of advertising and marketing are used in the same way as in traditional banking; and borrowers are not required to have a long-term savings link with the entity. Conversely, JAK is owned by the members (depositors/borrowers); the capital is contributed by the members; its financial products are deposits and loans; it is based on economic freedom, justice, democracy, and solidarity; its fundamental publicity is the members themselves; and the borrowers must have a long-term relationship as depositors with the institution.

The aim of this work is to carry out a study, not only from the qualitative but especially from the quantitative point of view of the JAK loan system, as a revealing example of an

alternative banking model, because although ethical banking is growing in Europe, there is the paradox that it has difficulty competing with traditional banking precisely with regard to the interest rates it offers (San Emeterio & Retolaza, 2012).

This is a novel system in banking and, therefore, it is considered important, firstly, to increase awareness of its operation and, secondly, to analyze its suitability according to the circumstances applied in its concession. Banking customers, in general, are not familiar with the commercial characteristics of financial products, and financial engineering is beyond their expertise and understanding. Showing the positive as well as the negative aspects of a new product is an obligation of financial analysts in order to help users better manage their money and obtain financial resources.

After describing in the following section the functioning of the deposit and loan system of JAK, using the three types of potential combinations possible, the third section analyzes the real effective cost of a loan-savings transaction. This shows that there is an interest, although implicit, in loan transactions, contrary to what the philosophy of JAK advocates, although it is concealed under other names. For this, the classical methodology of Mathematical Finance is applied, specifically, based on the real conditions of the operations of JAK, the composition of each of the cash flows generated is formulated and, by means of the equation of financial equivalence between the benefit and the consideration, the real effective cost of a loan transaction is obtained. Both the general approach and the application to a particular case are shown, offering results. Finally, the most relevant conclusions derived from the analysis carried out are presented.

Description of the credit and savings system of JAK

JAK is, on the one hand, characterized for not paying monetary interest on the deposits it receives and, on the other hand, for not charging, in principle, monetary interest on the loans it grants, replacing such interest with positive and negative savings points, respectively. Thus, in the savings of the customer, a monetary unit deposited during a month generates a positive savings point; on the other hand, in the debt a monetary unit borrowed during a month generates a negative savings point or, equivalently, consumes a positive savings point (Carrie, 2001).

There is no compound capitalization in this banking, since the savings points do not generate, in turn, more savings points, but rather these are accrued only on the deposited capital. Table 1 shows the generation of the same in a deposit, where the amounts are delivered in a prepaid manner, that is, at the beginning of the month. It is important to point out that the withdrawal of funds from the deposit does not generate negative points; however, the amount withdrawn will stop generating positive points in the future while conserving all the points obtained previously.

Table 1
Generation of positive savings points in a variable amount deposit

Month	Monthly savings (u.m.)	Accumulated savings at the end of the month (u.m.)	Points generated in the month	Total accumulated points at the end of the month
1	S_1	$S_1 = s_1$	$Pm_1 = S_1$	$P_1 = S_1 = s_1$
2	S_2	$S_2 = S_1 + s_2$	$Pm_2 = S_2$	$P_2 = P_1 + Pm_2 = 2 \cdot s_1 + s_2$
3	S_3	$S_3 = S_2 + s_3$	$Pm_3 = S_3$	$P_3 = P_2 + Pm_3 = 3 \cdot s_1 + 2 \cdot s_2 + s_3$
...
n	S_n	$S_n = S_{n-1} + s_n = \sum_{r=1}^n s_r$	$Pm_n = S_n$	$P_n = P_{n-1} + Pm_n = \sum_{r=1}^n [n - (r - 1)] \cdot s_r$

Source: own elaboration

It is usual for savings to be made by depositing constant monthly amounts. Table 2 shows the evolution of the different magnitudes, in this case also considering the possibility that there is a previous balance, S_0 , which also generates savings points.

In effect, the total savings points generated with the deposit, P_n , are the sum of the balances at the end of each period, i.e. the sum of a series of variable terms in arithmetic progression, so that:

$$P_n = n \cdot S_0 + \frac{n \cdot (n + 1)}{2} \cdot s$$

where:

- S is the constant monthly savings
- S_0 is the previous balance in the savings account
- n is the number of monthly savings periods

Table 2
Generation of positive savings points in a fixed amount deposit and initial balance

Month	Monthly savings (u.m.)	Accumulated savings at the end of the month (u.m.)	Points generated in the month	Total accumulated points at the end of the month
1	s	$S_1 = S_0 + s$	$Pm_1 = S_1$	$P_1 = S_1 = S_0 + s$
2	s	$S_2 = S_1 + s = S_0 + 2 \cdot s$	$Pm_2 = S_2$	$P_2 = P_1 + Pm_2 = 2 \cdot S_0 + 3 \cdot s$
3	s	$S_3 = S_2 + s = S_0 + 3 \cdot s$	$Pm_3 = S_3$	$P_3 = P_2 + Pm_3 = 3 \cdot S_0 + 6 \cdot s$
...
n	s	$S_n = S_{n-1} + s_n = S_0 + n \cdot s$	$Pm_n = S_n$	$P_n = P_{n-1} + Pm_n = n \cdot S_0 + \frac{n \cdot (n+1)}{2} \cdot s$

Source: own elaboration

However, it is usual for the positive points generated not to be considered in their entirety, but to be corrected according to the so-called savings factor, Sf , established according to the situation of the system to avoid the total deficit of points of saving. Therefore: $0 < Sf < 1$. Normally the same is set at 0.7. Thus, the following would be the result:

$$P_n = \left(n \cdot S_0 + \frac{n \cdot (n+1)}{2} \cdot s \right) \cdot Sf$$

Similarly, Table 3 shows the generation of negative savings points in a loan, where amortization terms are delivered, as usual, on a postpaid basis, i.e. at the end of each month. The amortization system of JAK is usually that of constant amortization installments, so the different magnitudes would be simplified, as shown in Table 4, where:

$$A = \frac{D_0}{n}$$

Effectively, the total negative points generated by the loan, $-P_n$, are the sum of the outstanding debt at the end of each period, i.e. the sum of a series of variable terms in arithmetic progression, so that:

$$-P_n = - \left(n \cdot D_0 - \frac{n \cdot (n-1)}{2} \cdot A \right)$$

where:

- D_0 is the amount of the loan applied for
- A is the constant repayment installment of the loan
- n is the number of monthly amortization periods

Table 3
Generation of negative savings points on a loan with variable repayment installments

Month	Monthly amortization (u.m.)	Debt at the end of the month (u.m.)	Points generated in the month	Total accumulated points at the end of the month
0	-	D_0	-	-
1	A_1	$D_1 = D_0 - A_1$	$-Pm_1 = -D_0$	$-P_1 = -D_0$
2	A_2	$D_2 = D_1 + A_2$	$-Pm_2 = -D_1$	$-P_2 = -(P_1 + Pm_2) =$ $= -(2 \cdot D_0 - A_1)$
3	A_3	$D_3 = D_2 + A_3$	$-Pm_3 = -D_2$	$-P_3 = -(P_2 + Pm_3) =$ $= -(3 \cdot D_0 - 2 \cdot A_1 - A_2)$
...
n	A_n	$D_n = D_{n-1} + A_n =$ $= D_0 - \sum_{r=1}^n A_r =$ $= 0$	$-Pm_n = -D_{n-1}$	$-P_n = -(P_{n-1} + Pm_n) =$ $= -\left(n \cdot D_0 - \sum_{r=1}^{n-1} A_r \cdot (n-r)\right)$

Source: own elaboration

Table 4
Generation of negative savings points on a loan with fixed payment amortization

Month	Monthly amortization (u.m.)	Debt at the end of the month (u.m.)	Points generated in the month	Total accumulated points at the end of the month
0	-	D_0	-	-
1	A	$D_1 = D_0 - A$	$-Pm_1 = -D_0$	$-P_1 = -D_0$
2	A	$D_2 = D_1 + A =$ $= D_0 - 2 \cdot A$	$-Pm_2 = -D_1$	$-P_2 = -(P_1 + Pm_2) =$ $= -(2 \cdot D_0 - A)$

3	A	$D_3 = D_2 + A =$ $= D_0 - 3 \cdot A$	$-Pm_3 = -D_2$	$-P_3 = -(P_2 + Pm_3) =$ $= -(3 \cdot D_0 - 3 \cdot A)$
...
n	A	$D_n = D_{n-1} + A =$ $= D_0 - n \cdot A = 0$	$-Pm_n = -D_{n-1}$	$-P_n = -(P_{n-1} + Pm_n) =$ $= -\left(n \cdot D_0 - \frac{n \cdot (n-1)}{2} \cdot A\right)$

Source: own elaboration

JAK establishes an equilibrium system for each customer, so that the total of positive savings points must equal the total of negative savings points at the end of the repayment period of the loan requested. That is, the client accumulates positive savings points through the deposits made; on the other hand, the request for a loan will generate negative savings points. The positive points generated prior to the debt application, plus the positive savings points generated during the debt period, must match the negative savings points generated by the debt. Thus, it is usual that the customer, when applying for a loan, does not have enough accumulated positive savings points, or does not have any positive savings points; so that, in parallel to the amortization of the loan, the client must make a savings that can equal both balances of points.

Thus, three types of loan-savings combinations can be said to exist:

1. *Savings before the loan or pre-savings loan.* The positive savings points generated by the savings made before the loan is obtained are sufficient to cover the negative savings points generated by the loan. The duration of the savings period may or may not coincide with the duration of the subsequent loan period. This is illustrated in Figure 1.

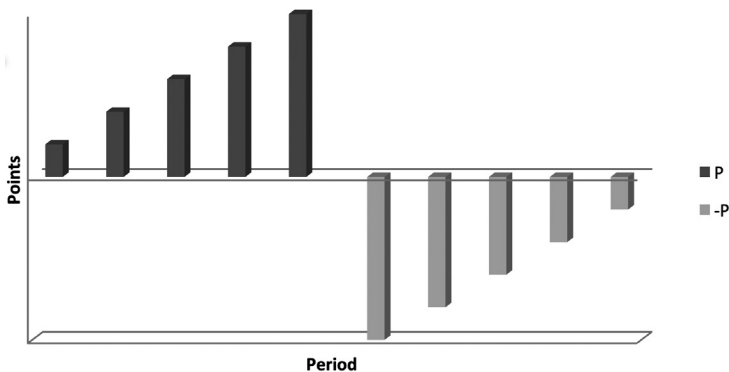


Figure 1. Positive and negative savings points of a pre-savings loan.

Source: own elaboration

2. *Simultaneous savings or after-savings.* The negative savings points generated by the loan are covered by positive savings points accrued through savings made during the life of the loan. This is illustrated in Figure 2.

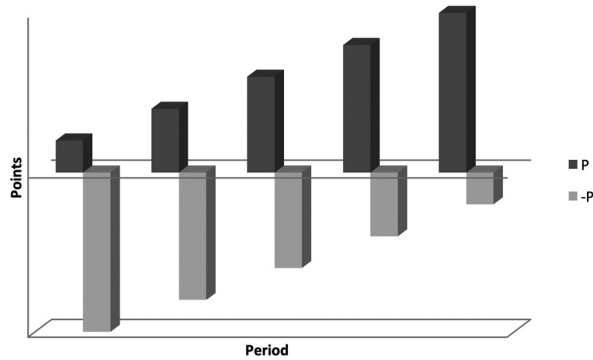


Figure 2. Positive and negative savings points of an after-savings loan.
Source: own elaboration

3. *Savings before and simultaneous to the loan or pre- and after-savings.* The positive savings points generated by the savings made before the loan was obtained are not sufficient to cover the negative savings points generated by the loan, so that during the life of the loan a savings transaction has to be carried out to match the positive and negative points. This is illustrated in Figure 3.

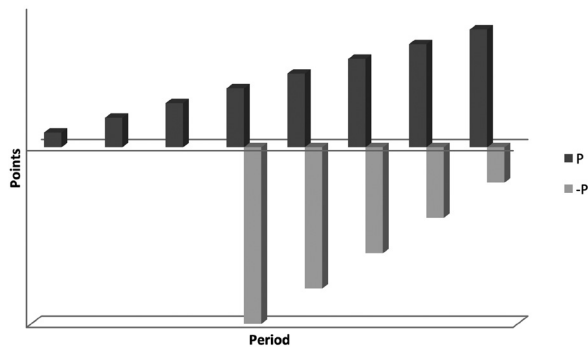


Figure 3. Positive and negative savings points of a pre-savings and after-savings loan. Source: own elaboration

This savings-loan system should not be confused with the amortization method traditionally known as sinking-fund, which in reality is nothing more than a combination of loan by the American method and a constitution transaction. The differences between the two are notorious, since in sinking-fund both transactions are independent and do not have to be carried out with the same financial entity; the deposits are remunerated and, therefore, the sum of the constitutive terms is lower than the loan principal; the loan has an explicit interest and no amount has to be amortized until the end of the operation.

It should be noted that JAK allows positive savings points obtained by a depositor to be transferred to another person to compensate for negative savings points generated by a loan that the depositor requests. In this sense, it could be qualified as solidarity banking; think, for example, of the possibility of depositors collaborating with this transfer in a project aimed at environmental improvements, health protection, development of an area, etc. It is not a matter of assigning a monetary amount, as in the case of donations, nor of lending a guarantor, but of transferring rights (positive savings points) that facilitate obtaining an economically viable loan to an organization.

Every loan applied for in JAK involves the establishment of a security deposit, S_d , which consists of withholding 6% of the loan principal to cover a possible default in repayment. This deposit does not generate positive savings points and is repaid to the borrower between 7 and 19 months after repayment of the loan. Thus, if the necessary capital is D_N , the amount of the loan should be:

$$D_0 = \frac{D_N}{0,94}$$

The personnel and other infrastructure costs of JAK are covered at approximately 80% by the so-called loan fee, L_f , which is an interest calculated as a percentage of the capital due on the loans granted. In particular, it is currently 3% of the outstanding capital. Thus, for each period $j = 1, 2, \dots, n$

$$L_f_j = \sum_{j=0}^{n-1} \frac{0,03}{12} \cdot D_{j-1}$$

so that each monthly payment to be made for the loan, regardless of the possible amount needed to be delivered as a post-savings, will be the sum of the repayment installment and the loan fee, i.e.:

$$A + \frac{0,03}{12} \cdot D_{j-1}$$

JAK, like other financial institutions, requires personal or mortgage guarantees in the granting of loans (assume that the described operation of loans is unique and, therefore, common for any form of loan, whether personal or mortgage, and applicable to any amount). That is to say, ethical banking, in general, requires similar guarantees as traditional banking (San-Jose et al., 2011), which is actually a problem in avoiding social exclusion, this being one of its aims. In the absence of such guarantees, or in the absence of compulsory savings, the loan fee would rise to 4.5%; furthermore, in such circumstances, the loan could not exceed the amount of 100,000 SEK (Swedish Krona), equivalent to approximately 9,700 euros at the individual level or 200,000 SEK for the family unit; however, a fixed payroll would be necessary to obtain it. By granting these unsecured loans, or oral loans, JAK complies with the 3 basic principles that should guide companies to model ethical behavior (Donaldson, 1996): respect the core human values that determine the threshold of absolute morality in all business activities, respect local traditions, and respect the belief that context matters when deciding what is right and what is not. This is a matter of helping the development of a local activity, of a collective that presents, in general, a social commitment, that is, its link with a community where the noncompliance will suppose a refusal of the entity to lend again and, therefore, that collective will exert pressure for the fulfillment of the payments.

The remaining 20% of the administrative and operating costs of JAK are covered by a membership fee, *Mf*, which is annual and must be paid by each member (mere depositor or borrower). It is set at 250 SEK, which is equivalent to about 26 euros.

Example. Take a person who needs a capital of 20,000 euros, and said person applies for a loan with a duration of 5 years. Considering that 6% is retained as a security deposit, in order to dispose of 20,000 euros, a loan of 21,276.60 euros will be needed, as there is an initial retention of 1,276.60 euros.

The repayment of the capital will be made in 60 months, so the constant repayment installment will be:

$$A = \frac{21.276,60}{60} = 354,61 \text{ euros.}$$

The negative savings points generated by the loan will be:

$$-P_n = -\left(60 \cdot 21.276,60 - \frac{60 \cdot 59}{2} \cdot 354,61\right) = -648.937 \text{ points.}$$

The assumption is that this person has made a previous saving during the past year, earning 300 euros at the beginning of each month. If it is considered that 0.7 is applied as a savings factor, at the time of the loan, the balance will be of $300 \cdot 12 = 3.600$ euros, generating a number of positive savings points of:

$$P_0 = \frac{12 \cdot 13}{2} \cdot 300 \cdot 0,7 = 16.380 \text{ points.}$$

Therefore, this person would require points that will have to be obtained with the after-savings, that is, with deposits to be made during the repayment period of the loan. Knowing that:

$$632.557 = \left[(60 \cdot 3.600) + \left(\frac{60 \cdot 61}{2} \cdot s \right) \right] \cdot 0,7$$

It turns out that the constant savings, s , that will have to be made in a prepaid way on each of the 60 months of amortization, is equal to 375.77 euros.

Table 5 (at the end of the work) shows the evolution of each of the different magnitudes.

Analysis of the real cost of loans granted by Jak Medlemsbank

To determine the real cost of the loan it is necessary to determine the cash flows (collections and payments) generated at each period of time (see subsequent analytical development in Table 6):

- During the period prior to the granting of the loan, provided that there is a pre-savings, the cash flows shall correspond to the payments to be made for the pre-savings, plus, at the beginning of each year, the amount corresponding to the annual membership fee.

- At the time the loan is granted, that is, at the end of the m -th period, the cash flow will be comprised of the capital actually needed by the borrower (collection of the loan principal minus the security deposit), minus the necessary savings quota corresponding to each period (month) of the term of the loan, minus the annual membership quota in the event that the pre-savings take place over an entire number of years and, consequently, their payment corresponds to that moment (otherwise, it is easy to make the appropriate adjustment).

- During the loan repayment period, negative cash flows will correspond to the sum of the constant repayment installment for each period plus the loan installment plus the savings installment needed to cover negative savings points, plus, at the beginning of each year, the amount corresponding to the annual membership fee.

- The cash flow corresponding to the moment of cancellation of the loan will include the payment of the last amortization installment and the last installment of the loan, as well as the collection of the savings deposit accumulated during the pre- and after-savings period.
- The last cash flow corresponds to the return of the security deposit, usually seven months after the cancellation of the loan.

Table 6
Cash flows and effective cost of a loan operation

	m	number of periods (months) of pre-savings, before the granting of the loan
	n	number of loan term periods (months)
Annotation	F_j	cash flow corresponding to instant j
	S_j	savings for period j
	Mf	annual membership fee, paid at the beginning of each year
For : $j = 0, 1, \dots, m - 1$:		
Cash flows prior to the granting of the loan (pre-savings)	$F_j = \begin{cases} F_j = -(s_{j+1} + Mf), & \text{si } j = 12 \cdot h, \text{ con } h = 0, 1, 2, \dots, \frac{m}{12} - 1 \\ F_j = -s_{j+1}, & \text{si } j \neq 12 \cdot h, \text{ con } h = 0, 1, 2, \dots, \frac{m}{12} - 1 \end{cases}$	
Cash flow at the time the loan is granted	For : $j = m$	$F_m = D_N - s_{m+1} + Mf$
For : $j = m + 1, \dots, m + n - 1$		
Cash flows during the loan repayment period	$F_j = \begin{cases} F_j = -(A + Lf_j + s_{j+1} + Mf), & \text{si } j = 12 \cdot h, \text{ con } h = \frac{m}{12} + 1, \dots, \frac{m+n}{12} - 1 \\ F_j = -(A + Lf_j + s_{j+1}), & \text{si } j \neq 12 \cdot h, \text{ con } h = \frac{m}{12} + 1, \dots, \frac{m+n}{12} - 1 \end{cases}$	
Cash flow at the instant of loan cancellation	For : $j = m + n$	$F_{m+n} = -(A + Lf_{m+n}) + S_{m+}$
Cash flow at the instant of recovery of the security deposit	For : $j = m + n + 7$	$F_{m+n+7} = 0,06 \cdot D_0$

Equation of financial equivalence	Established at the time the loan is granted. $F_m + F_{m+n} \cdot (1 + i_{(12)})^{-n} + F_{m+n+7} \cdot (1 + i_{(12)})^{-(n+7)} =$ $= \sum_{j=0}^{m-1} F_j \cdot (1 + i_{(12)})^{m-j} + \sum_{j=m+1}^{m+n-1} F_j \cdot (1 + i_{(12)})^{-(j-m)}$
Annual effective cost	$i = (1 + i_{(12)})^{12} - 1$

Source: own elaboration

Consequently, the financial equivalence equation that determines the annual effective cost of the loan (Valls and Cruz, 2013) is the one that matches positive cash flows (collections) with negative cash flows (payments). Finally, once the effective monthly cost is obtained, the effective annual cost is immediately obtained (De Pablo López, 2014), which will make it possible to compare the cost of this type of loan with that of traditional banks or other sources of financing.

Example. Continuing with the example above, if 12 months of pre-savings are considered, the corresponding cash flows are the following:

- $F_0 = -(300 + 26) = -326$ euros.
- $F_1 = F_2 = \dots = F_{11} = -300$ euros.
- $F_{12} = 21.276,60 - (1.276,60 + 375,77 + 26) = 19.598,23$ euros.
- $F_{13} = F_{14} = \dots = F_{71} = -(375,77 + 354,61 + Lf_j)$ euros, considering that the annual membership fee (26 euros) must be added to F_{24}, F_{36}, F_{48} and F_{60} .
- $F_{72} = -(354,61 + Lf_{72}) + 26.146,20$ euros.
- $F_{79} = 1.276,60$ euros.

Therefore, taking the financial equivalence equation, as explained above:

$$19.598,23 + [-(354,61 + 0,89) + 26.146,20] \cdot (1 + i_{(12)})^{-60} + 1.276,60 \cdot (1 + i_{(12)})^{-67} =$$

$$= 326 \cdot (1 + i_{(12)})^{12} + \sum_{j=1}^{11} 300 \cdot (1 + i_{(12)})^{12-j} + \sum_{j=13}^{71} F_j \cdot (1 + i_{(12)})^{-(j-12)}$$

It is obtained that: $i = 58,8968\%$.

The high effective cost of a loan, that in principle is presented to the public as interest-free (i.e. without explicit interest), stands out. This is due to the demand for savings (pre-savings and after-savings) without any remuneration, which implies a significant immobilization of funds. If the cost of the loan was calculated without providing for the savings required, considering only the loan quota (3% of the live capital in each period), the annual membership quota, and the retention, the cost would be of only 3.771%.

Without taking into account the pre-savings — which, the longer the term, the more expensive the loan, as it involves a more lasting immobilization of funds— and, if the cost is obtained considering that the savings are all subsequent to the granting of the loan, an amount of 506.59 euros would be delivered at the beginning of each month, then the cost of the loan would be 42.1554%, a very high value.

It is also important to note that the availability of money to meet the repayment of this type of loan is a major obstacle for the borrower, who has to deliver a significant monthly amount to meet the repayment requirements. Thus, in the example discussed, if no pre-savings were available, each month 354.61 euros would have to be paid as a repayment installment, plus 506.59 euros to constitute the savings, plus the loan fee (which, in reality, is an interest rate of 3%, not significant in the case of low interest rates), plus the annual membership fee, when applicable. That is to say, considering that the loan fee oscillates between 53.19 euros in the first month and 0.89 euros in the last month, the monthly amount is then between 914.39 euros and 862.09 euros (plus 26 euros, when applicable). This applies for 60 months in order to have an initial availability of 20,000 euros. It is obvious that, although at the end of the operation the borrower recovers the amount saved, the monetary availability of funds during the life of the loan is high, especially considering that a private individual applying for a loan must have monetary difficulties.

To better illustrate these statements various alternatives are considered, as illustrated in Table 6. Firstly, the situation of not requiring savings from the borrower, neither pre-savings nor after-savings (because the positive savings points necessary to balance the operation have been obtained from donations made by third parties), according to JAK conditions, the effective cost of the loan is equal to 3.77% and represents the optimum situation that generates the lowest possible effective cost for this type of loans. As donations of points do not cover all the necessary positive points, and these would have to be generated with post-savings, it is observed how the effective cost increases as the necessary savings are greater. Likewise, if the required savings were also obtained with pre-savings, then the cost would continue to increase in line with the greater pre-savings carried out. All of this is a consequence of the unavailability of funds immobilized for a long period and without any remuneration.

In brief, a bank that presents itself as interest-free in its philosophy, in reality for operational purposes does have an effective cost for borrowers and, moreover, one that is high in

Table 6
Variation of the effective cost according to the required savings

Required savings	Pre-savings	After-savings	Effective cost
No	-	-	3,77%
25% points	-	126.65 €/month (60 months)	6,03%
50% points	-	253.30 €/month (60 months)	11,83%
75% points	-	379.94 €/month (60 months)	24,70%
100% points	-	506.59 €/month (60 months)	42,16%
100% points	100 €/month (12 months)	462.98 €/month (60 months)	44,89%
100% points	250 €/month (12 months)	397.57 €/month (60 months)	50,35%
100% points	500 €/month (12 months)	288.85 €/month (60 months)	67,31%

Data applied for a loan of 21,276.60 euros, corresponding to financial needs of 20,000 euros, to be repaid monthly with equal instalments over a period of 5 years. The loan represents 648,937 negative savings points, which must be matched with positive savings points generated with own deposits or ceded by a third party.

Source: own elaboration

general terms. Islamic banking behaves similarly, the philosophy of which also underlies the absence of interest, but is also not really free of interest, especially in its expansion outside the Islamic area (Hyder, 2013). Indeed, Islamic banking customers are highly satisfied with the investment and savings accounts, but low with the financing, because of the real effective costs they pay (Metawa & Almosawi, 1998).

Thinking of traditional banking, the drop in the main reference index for loan operations, EURIBOR, has led to these operations being carried out at increasingly lower interest rates, both for mortgage and personal loans. Therefore, the asset operations of this type of ethical banking currently entail higher effective costs than those of traditional banking.

On the other hand, however, the profitability of traditional savings products, such as deposits, both at sight and fixed-term, or investment in public debt, have been gradually decreasing until they are now even at negative levels, which obviously facilitates the placement of savings in an ethical bank, such as that analyzed in this paper, which makes it possible to set up a points fund to reduce the cost of future loans.

Conclusions

The results show how the loans granted by the Swedish ethical bank JAK Medlemsbank have a real effective cost, despite the fact that its philosophy is against charging interest. However, although there is no explicit interest in this type of operation, there is a latent implicit interest.

JAK has a peculiar system established through positive and negative savings points, with which it seeks to disassociate itself from the traditional interests of traditional banking,

implying that the borrower will only have to pay the minimum amount necessary to sustain its small banking infrastructure for the loan obtained. However, once the operation of this bank has been analyzed, it can be observed how the loans granted present two major negative aspects from an economic-financial point of view: first, if there is no pre-savings with which sufficient positive savings points have been generated to compensate to a large extent or completely for the negative points caused by the loan, the amount to be paid to amortize the loan and to constitute the post-savings implies for the lender the need to have periodically high liquid means, and this will normally suppose an important liquidity inconvenience for them; second, the requirement of the necessary savings, pre- or after-, considerably increases the effective cost of the loans, due to the monetary unavailability that it supposes during a long period of time. Furthermore, this cost is greater with greater pre-savings.

In short, the effective cost or implicit interest is given by the conjunction of the so-called loan fee (which is nothing more than a minimum remuneration set at 3%), the annual membership fee, the retention of 6% of the amount borrowed, and the lack of funds without remunerating the necessary savings.

However, it should not be forgotten that positive savings points can be transferred by some depositors to others so that, for the implementation of certain projects by organizations with social purposes —such as foundations— to which positive points previously generated by them are ceded by individuals or entities, the system developed by JAK would indeed be highly advisable, as the effective cost of the loans obtained would be limited to a little more than 3%. Currently, given the practically zero interest on deposits in traditional banking, it would be easy to find depositors for JAK banking, who could later cede their positive savings points. This is, in short, the main appeal of this particular ethical banking.

On the other hand, considering the results and the fact that ethical banking is succeeding in Europe, it should be assumed that there are other significant variables in the growth of the phenomenon of ethical banking, apart from the profitability and effective cost of operations; this refers to variables fundamentally related to social profitability. In this sense, in the future it would be interesting to carry out specific research in quantitative terms to define and analyze these variables of social profitability related to the objectives of ethical banking customers. In short, using only financial variables that explain the existence and growth experienced by ethical banking can lead to a bias in the measurement of the phenomenon.

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Annex

Table 5
Example of a loan transaction

Month	A (postpaid)	D_s	-P	Lf(3%)	A+Lf	s (prepaid)	S	P (Sf=0,7)	A + Lf + s
0		21.276,60					3.600,00		
1	354,61	20.921,99	-21.276,60	53,19	407,80	375,77	3.975,77	2.783,04	783,57
2	354,61	20.567,38	-20.921,99	52,30	406,91	375,77	4.351,54	3.046,08	782,68
3	354,61	20.212,77	-20.567,38	51,42	406,03	375,77	4.727,31	3.309,12	781,80
4	354,61	19.858,16	-20.212,77	50,53	405,14	375,77	5.103,08	3.572,16	780,91
5	354,61	19.503,55	-19.858,16	49,65	404,26	375,77	5.478,85	3.835,20	780,03
6	354,61	19.148,94	-19.503,55	48,76	403,37	375,77	5.854,62	4.098,23	779,14
7	354,61	18.794,33	-19.148,94	47,87	402,48	375,77	6.230,39	4.361,27	778,25
8	354,61	18.439,72	-18.794,33	46,99	401,60	375,77	6.606,16	4.624,31	777,37
9	354,61	18.085,11	-18.439,72	46,10	400,71	375,77	6.981,93	4.887,35	776,48
10	354,61	17.730,50	-18.085,11	45,21	399,82	375,77	7.357,70	5.150,39	775,59
11	354,61	17.375,89	-17.730,50	44,33	398,94	375,77	7.733,47	5.413,43	774,71
12	354,61	17.021,28	-17.375,89	43,44	398,05	375,77	8.109,24	5.676,47	773,82
13	354,61	16.666,67	-17.021,28	42,55	397,16	375,77	8.485,01	5.939,51	772,93
14	354,61	16.312,06	-16.666,67	41,67	396,28	375,77	8.860,78	6.202,55	772,05
15	354,61	15.957,45	-16.312,06	40,78	395,39	375,77	9.236,55	6.465,59	771,16
16	354,61	15.602,84	-15.957,45	39,89	394,50	375,77	9.612,32	6.728,62	770,27
17	354,61	15.248,23	-15.602,84	39,01	393,62	375,77	9.988,09	6.991,66	769,39
18	354,61	14.893,62	-15.248,23	38,12	392,73	375,77	10.363,86	7.254,70	768,50
19	354,61	14.539,01	-14.893,62	37,23	391,84	375,77	10.739,63	7.517,74	767,61
20	354,61	14.184,40	-14.539,01	36,35	390,96	375,77	11.115,40	7.780,78	766,73
21	354,61	13.829,79	-14.184,40	35,46	390,07	375,77	11.491,17	8.043,82	765,84

Month	A (postpaid)	D_s	-P	Lf (3%)	A+Lf	s (prepaid)	S	P (Sf=0,7)	A + Lf + s
22	354,61	13.475,18	-13.829,79	34,57	389,18	375,77	11.866,94	8.306,86	764,95
23	354,61	13.120,57	-13.475,18	33,69	388,30	375,77	12.242,71	8.569,90	764,07
24	354,61	12.765,96	-13.120,57	32,80	387,41	375,77	12.618,48	8.832,94	763,18
25	354,61	12.411,35	-12.765,96	31,91	386,52	375,77	12.994,25	9.095,98	762,29
26	354,61	12.056,74	-12.411,35	31,03	385,64	375,77	13.370,02	9.359,01	761,41
27	354,61	11.702,13	-12.056,74	30,14	384,75	375,77	13.745,79	9.622,05	760,52
28	354,61	11.347,52	-11.702,13	29,26	383,87	375,77	14.121,56	9.885,09	759,64
29	354,61	10.992,91	-11.347,52	28,37	382,98	375,77	14.497,33	10.148,13	758,75
30	354,61	10.638,30	-10.992,91	27,48	382,09	375,77	14.873,10	10.411,17	757,86
31	354,61	10.283,69	-10.638,30	26,60	381,21	375,77	15.248,87	10.674,21	756,98
32	354,61	9.929,08	-10.283,69	25,71	380,32	375,77	15.624,64	10.937,25	756,09
33	354,61	9.574,47	-9.929,08	24,82	379,43	375,77	16.000,41	11.200,29	755,20
34	354,61	9.219,86	-9.574,47	23,94	378,55	375,77	16.376,18	11.463,33	754,32
35	354,61	8.865,25	-9.219,86	23,05	377,66	375,77	16.751,95	11.726,37	753,43
36	354,61	8.510,64	-8.865,25	22,16	376,77	375,77	17.127,72	11.989,40	752,54
37	354,61	8.156,03	-8.510,64	21,28	375,89	375,77	17.503,49	12.252,44	751,66
38	354,61	7.801,42	-8.156,03	20,39	375,00	375,77	17.879,26	12.515,48	750,77
39	354,61	7.446,81	-7.801,42	19,50	374,11	375,77	18.255,03	12.778,52	749,88
40	354,61	7.092,20	-7.446,81	18,62	373,23	375,77	18.630,80	13.041,56	749,00
41	354,61	6.737,59	-7.092,20	17,73	372,34	375,77	19.006,57	13.304,60	748,11
42	354,61	6.382,98	-6.737,59	16,84	371,45	375,77	19.382,34	13.567,64	747,22

Month	A (postpaid)	D_s	-P	Lf (3%)	A+Lf	s (prepaid)	S	P (Sf = 0,7)	A + Lf + s
43	354,61	6.028,37	-6.382,98	15,96	370,57	375,77	19.758,11	13.830,68	746,34
44	354,61	5.673,76	-6.028,37	15,07	369,68	375,77	20.133,88	14.093,72	745,45
45	354,61	5.319,15	-5.673,76	14,18	368,79	375,77	20.509,65	14.356,76	744,56
46	354,61	4.964,54	-5.319,15	13,30	367,91	375,77	20.885,42	14.619,79	743,68
47	354,61	4.609,93	-4.964,54	12,41	367,02	375,77	21.261,19	14.882,83	742,79
48	354,61	4.255,32	-4.609,93	11,52	366,13	375,77	21.636,96	15.145,87	741,90
49	354,61	3.900,71	-4.255,32	10,64	365,25	375,77	22.012,73	15.408,91	741,02
50	354,61	3.546,10	-3.900,71	9,75	364,36	375,77	22.388,50	15.671,95	740,13
51	354,61	3.191,49	-3.546,10	8,87	363,48	375,77	22.764,27	15.934,99	739,25
52	354,61	2.836,88	-3.191,49	7,98	362,59	375,77	23.140,04	16.198,03	738,36
53	354,61	2.482,27	-2.836,88	7,09	361,70	375,77	23.515,81	16.461,07	737,47
54	354,61	2.127,66	-2.482,27	6,21	360,82	375,77	23.891,58	16.724,11	736,59
55	354,61	1.773,05	-2.127,66	5,32	359,93	375,77	24.267,35	16.987,15	735,70
56	354,61	1.418,44	-1.773,05	4,43	359,04	375,77	24.643,12	17.250,18	734,81
57	354,61	1.063,83	-1.418,44	3,55	358,16	375,77	25.018,89	17.513,22	733,93
58	354,61	709,22	-1.063,83	2,66	357,27	375,77	25.394,66	17.776,26	733,04
59	354,61	354,61	-709,22	1,77	356,38	375,77	25.770,43	18.039,30	732,15
60	354,61	0,00	-354,61	0,89	355,50	375,77	26.146,20	18.302,34	731,27
TOTAL	21.276,60		-648.936,30	1.622,34	22.898,94	22.546,20		632.561,37	45.445,14

Source: own elaboration