7. Costo Anual Equivalente (CAE)

Definición: El Costo Anual Equivalente de un proyecto de inversión no es otra cosa que sus costos e ingresos, si los hay, presentes y futuros, medidos en términos del costo anual uniforme al cual equivalen.

Este indicador se emplea particularmente para evaluar proyectos que fundamentalmente son fuentes de gastos, tales como prestar un servicio, subsidio, mantener un servicio que es un apoyo para otras actividades, es decir, proyectos que no son generadores directos de ingresos.

Este criterio se conoce también con el nombre de "Costo Anual Uniforme Equivalente" (CAUE).

Su estimación se basa principalmente en las equivalencias "dado S encontrar R" y "dado P encontrar R" y usando la tasa de interés de oportunidad como la tasa de equivalencia, se tiene entonces que:

$$CAE(i^*) = \sum_{i=1}^{N} R_1 \quad \text{Para i =1.....n equivalentes anuales.}$$

El CAE se puede estimar de dos formas:

- Obteniendo el equivalente anual (R) de cada uno de los egresos e ingresos y sumarlos algebraicamente.
- Obteniendo el VPN de todos los ingresos y egresos del proyecto y llevarlo después a su equivalente anual.

Ejercicio 7-01: El Ingenio Providencia desea conocer el CAE de una guía que planea comprar, la cual tiene un costo inicial de $60'000.000, costos anuales de operación y mantenimiento de $10'000.000, una vida útil de cinco años y al final de ella se puede vender en $30'000.000. El interés de oportunidad del ingreso es del 20% anual.

- ***Solución Forma 1 :***

CAE (20%) = R1 + R2 - R3

donde: R1 = Equivalente anual del costo de la guía.

R2 = Equivalente anual de los costos de operación y mantenimiento.

R3 = Equivalente anual del valor de salvamento.

R1 = $60'000.000 (R/P, 20%, 5)

R1 = $60'000.000 (0.33438) = $ 20'062.800

R2 = $ 10'000.000 (los costos de operación y mantenimiento ya están anualizados).

R3= $30'000.000 (R/S, 20%, 5)

R3= $30'000.000 (0.13438) = $4'031.400

Por lo tanto:

CAE (20%) = R1 + R2 - R3

CAE (20%)= $20'062.800 + $10'000.000 - $4'031.400

CAE (20%) = $26'031.400 (costo anual de prestar el servicio del guía)

- ***Solución Forma 2***

VPN (20%) = $60'000.000 + $10'000.000 (P/R, 20%, 5) - $30'000.000 (P/S, 20%,5)

= $60'000.000 + $10'000.000 (2.990612) - $30'000.000 (0.401878)

= $60'000.000 + $29'906.120 - $12'056.340

VPN (20%) = $77'849.780

Luego: CAE (20%) = VPN (20%) (R/P, 20%, 5)

= $ 77'849.780 (0.334380)

= $ 26'031.400

7.1. CAE en la jerarquización de proyectos

El criterio del CAE sirve para comparar proyectos que implican mayores costos y que suplen la misma necesidad, proyectos mutuamente excluyentes, por lo tanto es necesario seleccionar el mejor. Este criterio selecciona a aquel que tenga el **menor** CAE como el mejor, los demás quedan automáticamente descontados en términos económicos.

Ejercicio 7-02: El Ingenio Manuelita S.A. está analizando la posibilidad de reemplazar la cosecha mensual de la caña por cosecha mecánica. Para ello dispone de la siguiente información:

- ***Alternativa A:*** Una máquina recolectora de caña tiene un costo de $120'000.000, sus costos de mantenimiento se estiman en $12'000.000 anuales y los de operación, incluyendo el operario, en $10'000.000 anuales. La máquina tiene un valor de salvamento de $30'000.000 al final del octavo año.
- ***Alternativa B:*** La máquina reemplaza una cuadrilla de mano de obra que cuesta inicialmente $50'000.000 al año y su costo se incrementa cada dos años en un 20%.

Utilizando el criterio del CAE, ¿cuál de las dos alternativas recomendaría usted, si el costo del capital de la empresa es del 30% anual?

- ***Alternativa A:***

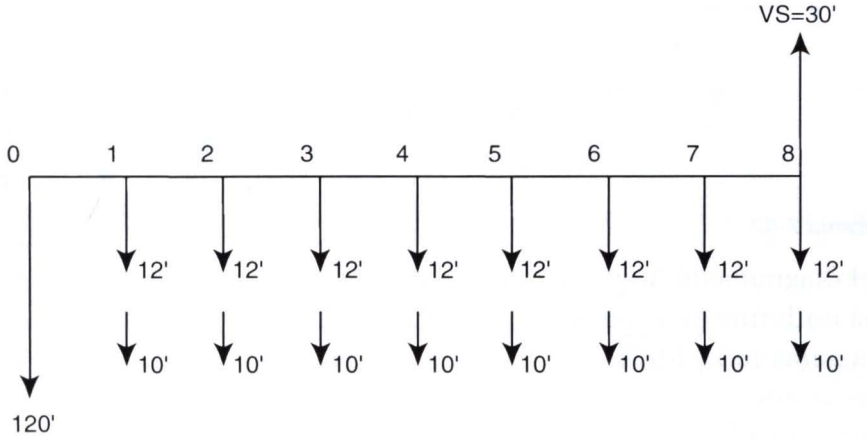


Diagrama 7-01: Alternativa A

CAE_A (30%) = R1 + R2 - R3

donde: R1 = Equivalente anual del costo de la máquina.

R2 = Costo anual de operación y mantenimiento.

R3 = Equivalente anual del valor de salvamento.

R1 = $120'000.000 (R/P, 30%, 8)

R1 = $120'000.000 (0.341915) = $ 41'029.800

R2 = $ 10'000.000 + $12'000.000

R2 = $22'000.000

R3= $30'000.000 (P/S, 30%, 8)

R3= $30'000.000 (0.041915) = $1'257.450

Por lo tanto:

CAE_A (20%) = R1 + R2 - R3

CAE_A (20%) = $41'029.800 + $22'000.000 - $ 1'257.450

CAE_A (20%) = $64'287.200

- ***Alternativa B:***

Período	1	2	3	4	5	6	7	8
Costo	50'	50'	60'	60'	72'	72'	86'4	86'4

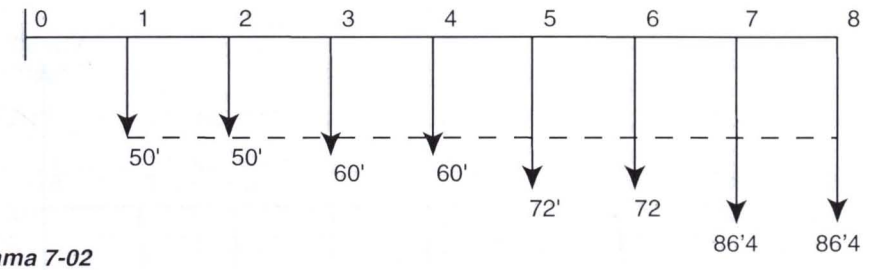


Diagrama 7-02

En el diagrama de flujos de la mano de obra se puede operar que $50'000.000 es una suma uniforme para todos los períodos, por lo tanto ya se tiene un R1, quedando dicho diagrama reducido a:

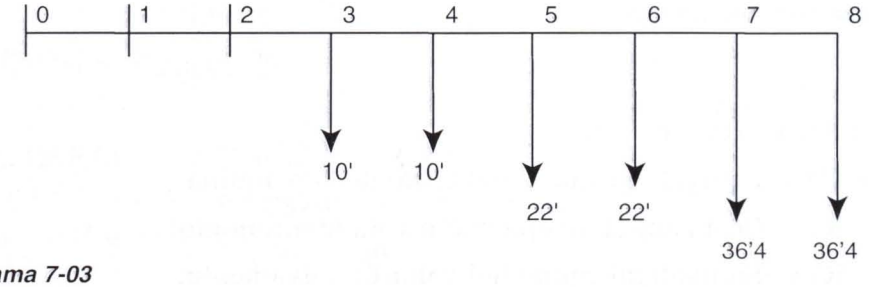


Diagrama 7-03

Por lo tanto se puede plantear que:

CAE_B (30%) = R1 + R2

donde: R1= $50'000.000

R2 = Equivalente anual de las sumas del diagrama reducido

Para estimar R2 obtenemos primero el valor futuro de las cifras del diagrama reducido y luego encontramos su equivalente anual así:

S_{resto} (30%) = $36'400.000 + $36'400.000 (S/P, 30%, 1) + 22'000.000 (S/P, 30%,2) + $22'000.000(S/P,30%,3) + $10'000.000(S/P,30%,4)+ 10'000.000 (S/P, 30%,5)

S_{resto} (30%) = $36'400.000 + $36'400.000 (1.3) + 22'000.000 (1.69) + $22'000.000(2.197) + $10'000.000(2.8561)+ 10'000.000(3.71293)

= $36'4 +47'32 +37'18+48'334+28'561+37'1293

S resto (30%) = $234'924.300

Luego: R2= S_{resto} (30%) (R/S, 30%, 8)

R2 = $234'924.300 (0.041915)

= $9'846.852

CAE_B (30%) = R1 + R2

= $50'000.000 + $9'846.852

= $59'846.852

CAE_B (30%) < CAEA (30%)

Respuesta: Se recomendaría continuar con la cosecha manual ya que implica un menor costo anual.

7.2. Aplicaciones

Ejercicio 7-03: ¿Cuál es el costo anual equivalente de usar la maquinaria agrícola en la empresa Palestina S.A. si su costo de adquisición fue de $36'500.000, tiene unos costos de mantenimiento y operación de $2'500.000 anuales y una vida útil de seis años, con un valor de salvamento de $12'000.000. El interés de oportunidad de la empresa es del 1.81% mensual.

Como la información de la maquinaria está expresada en términos anuales y el criterio CAE se refiere a dicho período, se debe primero que todo encontrar la tasa de interés de oportunidad anual equivalente del 1.81% mensual.

$$i^*_{anual} = (1+i_p)^{12} - 1 = (1.0181)^{12} - 1 = 0.24 = 24\% \text{ anual}$$

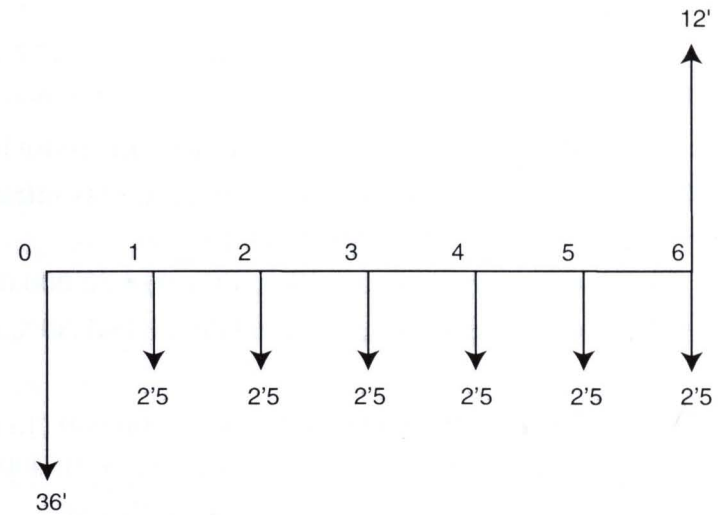


Diagrama 7-04

Del diagrama de flujos se puede plantear que:

CAE (24%) = R1 + R2 - R3

donde: R1= Equivalente anual del costo de adquisición.
R2 = Costo anual de operación y mantenimiento.
R3= Equivalente anual del valor de salvamento.

R1 = $36'000.000 (R/P, 24%, 6)
R1 = $36'000.000 (0.331074) = $ 11'918.664

R2 = $ 2'500.000

R3= $12'000.000 (R/S, 24%, 6)
R3= $12'000.000 (0.091074) = $1'092.888

Por lo tanto:
CAE (24%) = R1 + R2 - R3
CAE (24%) = $11'918.664 + $2'500.000 - $ 1'092.888
CAE (24%) = $15'511.552

8. Análisis incremental o marginal

Cuando se desea jerarquizar proyectos se ha visto que el criterio del VPN es el más indicado y sirve para ello en forma directa. En ocasiones, a pesar de lo anterior se hace indispensable (solicitud expresa de los donantes o de los financiadores) presentar el análisis de jerarquización utilizando interés como la TIR o la RBC. Como se ha mostrado a lo largo de este escrito con estos criterios, usándolos en forma directa, no es posible jerarquizar proyectos en forma correcta, por lo tanto se quiere en esta parte presentar para discusión un procedimiento denominado Análisis Incremental o Análisis Marginal mediante el cual se pueden jerarquizar proyectos, ya sea cuando existen limitaciones de capital para invertir en proyectos independientes, o cuando se trata de proyectos mutuamente excluyentes.

El procedimiento se puede sintetizar en los pasos siguientes:

- Se calculan para cada proyecto sus flujos netos.
- Se estiman para cada proyecto el VPN, la TIR y la RBC, utilizando cuando sea necesario la tasa de interés de oportunidad del inversionista.
- Se eliminan todos aquellos proyectos que no cumplan con:

  $$VPN\ (i^*) > 0$$

  $$TIR > i^*$$

  $$RBC\ (i^*) > 1$$

- Se comparan los proyectos por pareja creando un nuevo proyecto que debe reflejar la diferencia de inversión o de período de vida útil y los flujos netos que estas diferenciaciones implican. ***Ejemplo:*** Proyecto (A-B) es igual a los flujos del proyecto A menos los flujos del proyecto B período a período. La vida útil de (A-B) debe ser igual a la vida útil del proyecto de mayor vida útil.
- Se estiman para el nuevo proyecto (A-B) los criterios de VPN, TIR y RBC y se analiza si estos cumplen con:

$$VPN\ (A\text{-}B)\ (i^*) > 0$$

$$TIR\ (A\text{-}B) > i^*$$

$$RBC\ (A\text{-}B)\ C(i^*) > 1$$

- Si el proyecto (A-B) cumple con las tres reglas anteriores se puede afirmar que el proyecto A es mejor y preferible al proyecto B. En caso de no cumplir se afirma lo contrario.
- Los tres pasos anteriores se repiten hasta agotar las comparaciones y con los resultados obtenidos se puede conformar una nueva jerarquización la cual, salvo algunos supuestos, se puede considerar acertada.

Es importante resaltar que tanto la jerarquización inicial realizada con el criterio de VPN como la que se haga con el análisis incremental van a coincidir, lo cual vuelve a probar que el VPN es el mejor criterio para tomar decisiones de inversión. Los principales factores que afectan la jerarquización de proyectos se relacionan con el tamaño de la conversión y con la duración de la vida útil de ellos. Por lo anterior se observa su efecto a través de la solución de ejemplos que reflejan dichas situaciones.

8.1. Proyectos con diferentes tamaños de inversión

Se plantea la siguiente situación:

Ejercicio 8-01: Una firma de inversionistas agrícolas tiene en mente producir para exportación hasta tres productos, cada uno de los cuales requiere equipos especializados y tienen una vida económica de cuatro a cinco años. Usando los criterios de VPN TIR y RBC, la información económica que se adjunta y una tasa de interés de oportunidad del grupo inversionista del 18% anual, qué recomendaciones se darían para las siguientes situaciones.

a) Los productos son independientes y no hay restricción de capital de inversión.

b) Los productos son mutuamente excluyentes.

Producto	Inversión inicial	Ingresos anuales	Costos anuales	Valor de salvamento
A	10.0	3.0	3.0	7.0
B	15.0	9.5	4.0	4.5
C	22.5	14.5	6.5	4.0
D	18.1	11.0	5.1	0.1
E	14.2	7.6	3.8	3.2

Cuadro 8-01: Flujos brutos, Ejercicio 8-01 (millones de $)

De acuerdo con la información del Cuadro 8-01 se obtienen los flujos netos para cada proyecto.

Período proyecto	0	1	2	3	4	5
A	-10.0	3.0	3.0	3.0	3.0	10.0
B	-15.0	5.5	5.5	5.5	5.5	10.0
C	-22.5	8.0	8.0	8.0	8.0	12.0
D	-18.1	5.9	5.9	5.9	5.9	6.0
E	-14.2	3.8	3.8	3.8	3.8	Producto

Cuadro 8-2: Flujos netos, Ejercicio 8-01 (millones de $)

Si se estiman los criterios de decisión se tiene que:

- VPN (18%)

$VPN_A(18\%) = 3\ (P/R, 18, 4) + 10\ (P/S, 18, 5) - 10 = 3.228076$

$VPN_B(18\%) = 5.5(P/R,18, 4) + 10\ (P/S, 18, 5) - 15 = 4.953231$

$VPN_C(18\%) = 8\ (P/R, 18, 4) + 12\ (P/S, 18, 5) - 22.5 = 5.209964$

$VPN_D(18\%) = 5.9(P/R\ 18, 4) + 6.0\ (P/S,18, 5) - 18.1 = 0.8661$

$VPN_E(18\%) = 3.8(P/R,18, 4) + 7.0\ (P/S,18, 5) - 14.2 = -0.367241$

- TIR teniendo (P/R, 18, 4) = 2.690062 y (P/S, 18, 5) = 0.515789

3(P/R,TIR,4) + 10 (P/S, TIR, 5) - 10= 0 TIR A = 26.45%

5.5(P/R,TIR,4)+10 (P/S, TIR, 5) - 15= 0 TIR B = 28.73%

8(P/R,TIR,4) + 12 (P/S, TIR, 5) - 22.5=0 TIR C = 26.67%

5.9(P/R,TIR,4) + 6.0 (P/S, TIR, 5) - 18.1= 0 TIR D = 18.96%

4.2(P/R,TIR,4) + 7.0 (P/S, TIR, 5) - 14.2= 0 TRI E = 15.35%

- RBC (18%) con base en flujos netos:

$RCB_A(18\%) = [3(P/R,18,4) + 10\ (P/S,18,5)] / 10 = 1.3228$

$RCB_B(18\%) = [5.5(P/R,18,4) + 10\ (P/S,18,5)] / 15 = 1.399$

$RCB_C(18\%) = [8(P/R,18,4) + 12\ (P/S,18,5)] / 22.5 = 1.2316$

$RCB_D(18\%) = [5.9(P/R,18,4) + 6.0\ (P/S,18,5)] / 18.1 = 1.0479$

$RCB_E(18\%) = [4.2(P/R,18,4) + 7.0\ (P/S,18,5)] / 14.2 = 0.9741$

De acuerdo con la información del Cuadro 8-01 se obtienen los flujos netos para cada proyecto.

Período proyecto	0	1	2	3	4	5
A	-10.0	3.0	3.0	3.0	3.0	10.0
B	-15.0	5.5	5.5	5.5	5.5	10.0
C	-22.5	8.0	8.0	8.0	8.0	12.0
D	-18.1	5.9	5.9	5.9	5.9	6.0
E	-14.2	3.8	3.8	3.8	3.8	Producto

Cuadro 8-2: Flujos netos, Ejercicio 8-01 (millones de $)

Si se estiman los criterios de decisión se tiene que:

- VPN (18%)

$VPN_A(18\%) = 3\ (P/R, 18, 4) + 10\ (P/S, 18, 5) - 10 = 3.228076$

$VPN_B(18\%) = 5.5(P/R,18, 4) + 10\ (P/S, 18, 5) - 15 = 4.953231$

$VPN_C(18\%) = 8\ (P/R, 18, 4) + 12\ (P/S, 18, 5) - 22.5 = 5.209964$

$VPN_D(18\%) = 5.9(P/R\ 18, 4) + 6.0\ (P/S,18, 5) - 18.1 = 0.8661$

$VPN_E(18\%) = 3.8(P/R,18, 4) + 7.0\ (P/S,18, 5) - 14.2 = -0.367241$

- TIR teniendo (P/R, 18, 4) = 2.690062 y (P/S, 18, 5) = 0.515789

$3(P/R,TIR,4) + 10\ (P/S, TIR, 5) - 10 = 0$ TIR A = 26.45%

$5.5(P/R,TIR,4) + 10\ (P/S, TIR, 5) - 15 = 0$ TIR B = 28.73%

$8(P/R,TIR,4) + 12\ (P/S, TIR, 5) - 22.5 = 0$ TIR C = 26.67%

$5.9(P/R,TIR,4) + 6.0\ (P/S, TIR, 5) - 18.1 = 0$ TIR D = 18.96%

$4.2(P/R,TIR,4) + 7.0\ (P/S, TIR, 5) - 14.2 = 0$ TRI E = 15.35%

- RBC (18%) con base en flujos netos:

$RCB_A(18\%) = [3(P/R,18,4) + 10\ (P/S,18,5)] / 10 = 1.3228$

$RCB_B(18\%) = [5.5(P/R,18,4) + 10\ (P/S,18,5)] / 15 = 1.399$

$RCB_C(18\%) = [8(P/R,18,4) + 12\ (P/S,18,5)] / 22.5 = 1.2316$

$RCB_D(18\%) = [5.9(P/R,18,4) + 6.0\ (P/S,18,5)] / 18.1 = 1.0479$

$RCB_E(18\%) = [4.2(P/R,18,4) + 7.0\ (P/S,18,5)] / 14.2 = 0.9741$

Resumiendo los resultados se tiene

Proyecto	VPN (18%)		TIR		RBC (18%)	
A	3.228076	III	26.45%	II	1.3228	II
B	4.953231	II	28.73%	I	1.399	I
C	5.209964	I	25.67%	III	1.2316	III
D	0.8661	IV	18.69%	IV	1.0479	IV
E	-0.367241	X	15.35%	X	0.9741	X

Cuadro 8-03: VPN, TIR y RBC de los proyectos, Ejercicio 8-01

Como se puede apreciar en el Cuadro 8-3, los tres criterios indican que el proyecto E debe eliminarse del **análisis** ya que tiene VPN **(18%)** < 0, RBC**(18%)**<1 y TIR = 15.35% < i* = 18%.

El problema **radica** ahora en cuáles son los proyectos que **se van** a recomendar de acuerdo con lo solicitado, si la jerarquización no es la misma, en este caso a través **del VPN**, **de la TIR** y de la **RBC.**

Como los proyectos tienen iguales períodos de vida se debe analizar qué pasa con las inversiones adicionales que se harán entre un proyecto y otro. Por lo tanto, para jerarquizar se aplica el análisis incremental según el procedimiento descrito en 8.1. así:

Inicialmente comparando el proyecto A con el B, y creando un proyecto (B-A) y la forma de hacerlo es restarle a los flujos del proyecto B los del proyecto A período por período, se observa en sus diagramas de flujo.

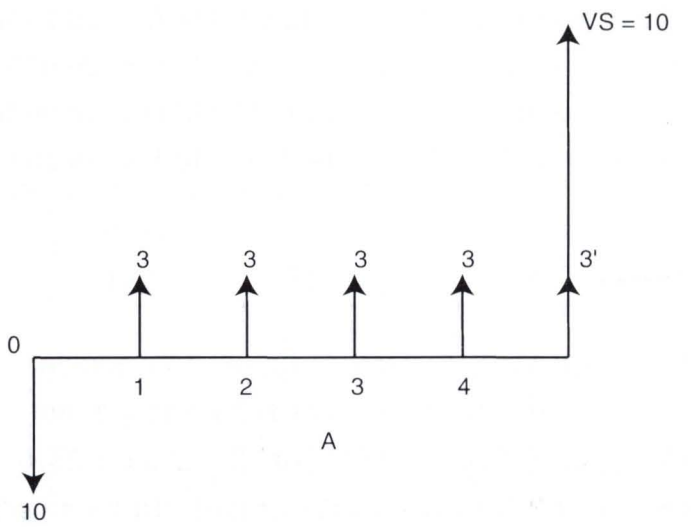


Diagrama 8-01: Proyecto A

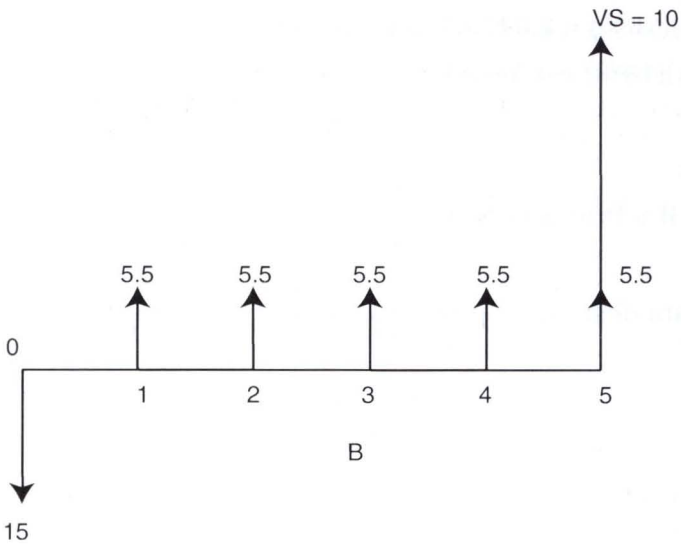


Diagrama 8-02: Proyecto B

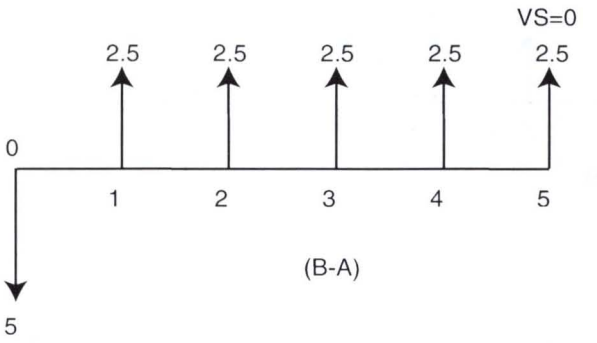


Diagrama 8-03

El proyecto (B-A) se puede interpretar como: en el proyecto B se hizo una inversión adicional de 5 millones de pesos en relación con la que se podría hacer en A (por las características propias del proyecto) y esta inversión adicional produce los ingresos adicionales que aparecen en el diagrama de flujo de (B-A). Por lo tanto, ahora se estiman de nuevo los indicadores de rentabilidad de este proyecto para **comprobar si** dicha inversión adicional genera una rentabilidad mayor a la tasa de interés de oportunidad del grupo de inversionistas:

VPN(B-A)(18%) = 2.5 (P/R, 18,5) - 5 = 2.5 (3.127171) = 2.817928

TIR(B-A) = 41.04% ; 2.5(P/R,TIR,5) = 5

RBC (B-A)(18%) = 2.5 (P/R,18,5)/ 5 = 1.56

De acuerdo con los tres criterios del proyecto (B-A) tiene una rentabilidad mayor al 18%. Por lo tanto se puede deducir que el proyecto B es mejor y preferible al proyecto A.

VPN(B-A)(18%) = 2.817928 > 0; TIR(B-A) = 41.04% > i* = 18% y
RBC (B-A)(18%) = 1.56 > 1

entonces:
Proyecto B > Proyecto A

Se compara después el proyecto C con el B y se tiene el proyecto (C-B)

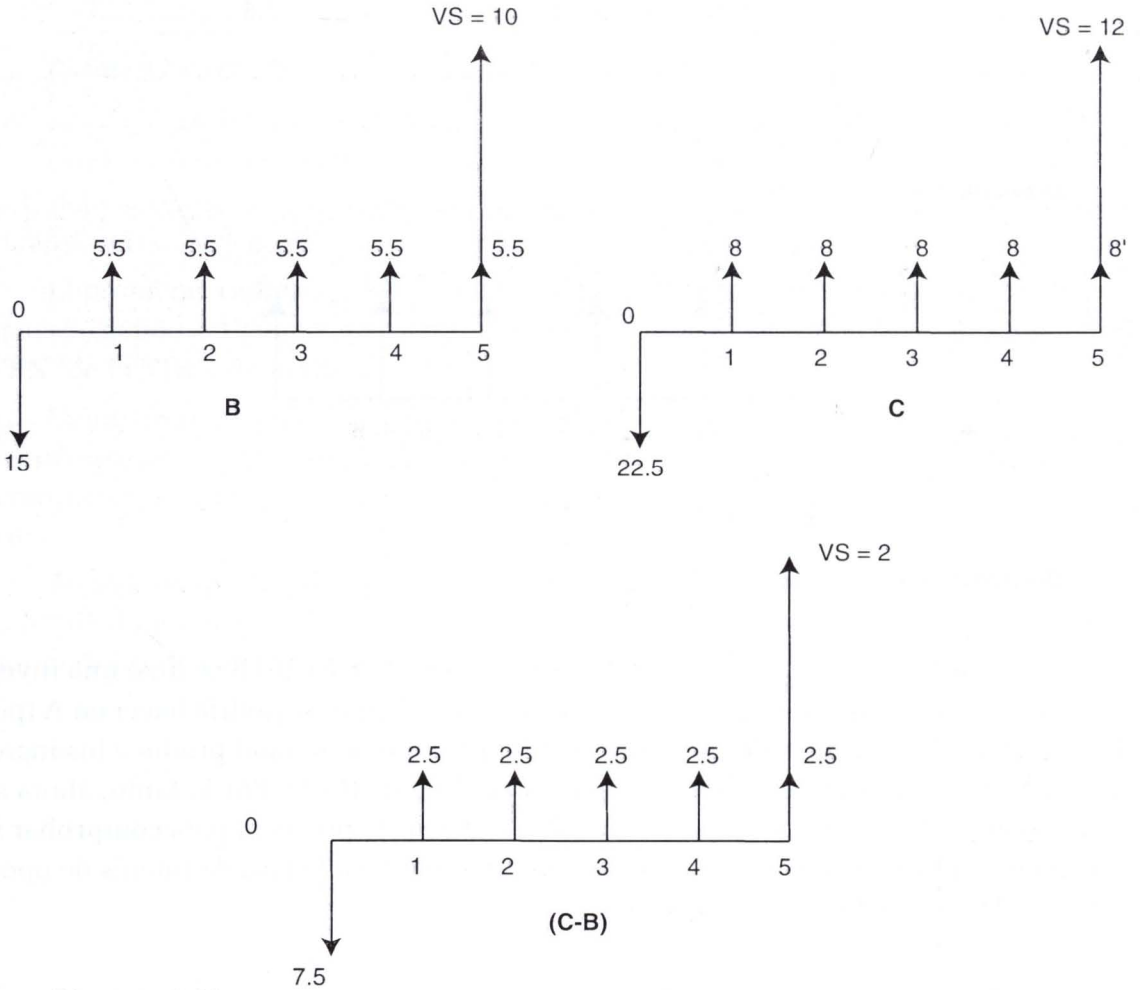


Diagrama 8-04

luego:

VPN(C-B)(18%) = 2.5 (P/R,18,5) + 2 (P/S,18,5) - 7.5 =
= 2.5 (3.127171) + 2 (0.515789)- 7.5 = 1.349506
2.5 (p/r, TIR, 4) + 4.5 (P/S, TIR,5) - 7.5 = 0 TIR(C-B) = 24.27%
RBC(C-B) (18%) = [2.5 (P/S,18,5) + 2 (P/S,18,5)] / 7.5 = 1.1799

Los tres indicadores muestran que el proyecto (C-B) tiene una rentabilidad mayor al 18%. Por lo tanto se puede concluir que el proyecto C es mejor y preferible al proyecto B en términos económicos.

VPN(C-B)(18%) = 1.349506 > 0 ; TIR(C-B) = 24.27% > i* =18%
y RBC(C-B) (18%) = 1.1799 > 1

entonces:
Proyecto C > Proyecto B

A esta altura del análisis se pueden jerarquizar los proyectos A, B y C; de acuerdo con los resultados del análisis marginal de los proyectos (B-A) y (C-B) se tiene entonces que:

de (B-A) resulta B > A
y de (C-A) resulta C > A
por lo tanto

C > B > A

se lee el proyecto C es mejor y preferible a B y este a su vez es mejor y preferible a A. Para responder las preguntas del proyecto se deberán comparar por último los proyectos A y B.

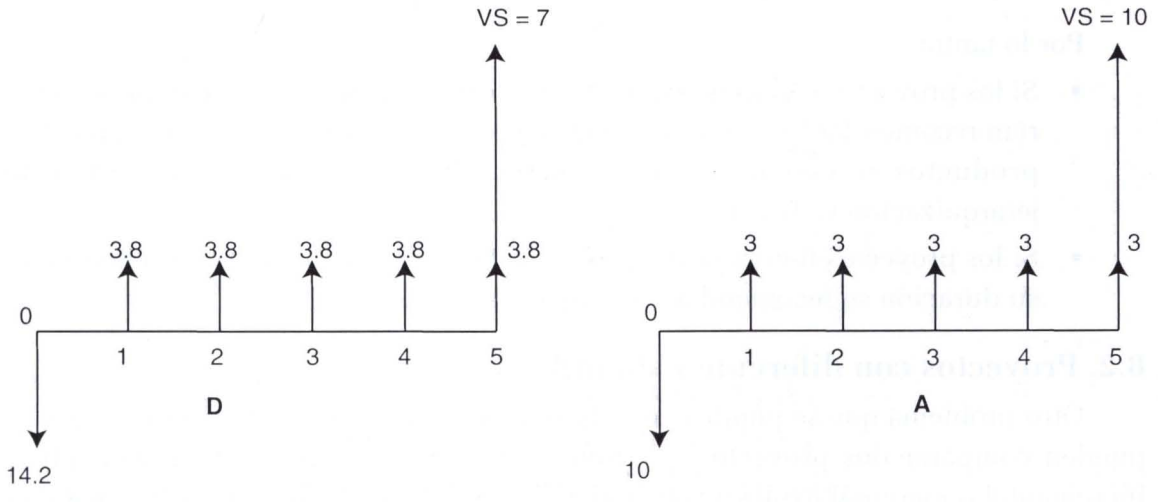
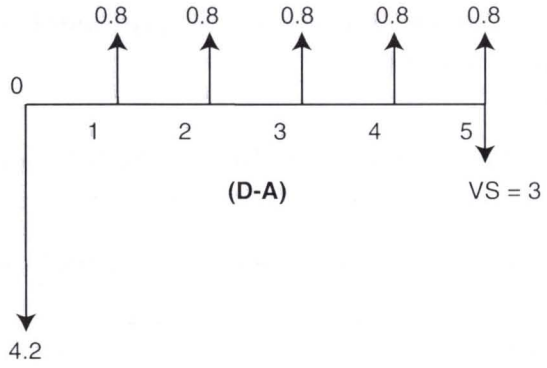


Diagrama 8-05



Calculando los indicadores para (D-A) se tiene:

$VPN_{(D-A)(}18\%) = 0.8\ (P/R,18,5) - 3(P/S,18,5) - 4.2$

$= 0.8\ (3.127171) - 3\ (0.515789) - 4.2 = -3.245630$

$0.8\ (P/R, TIR, 4) - 2.2\ (P/S, TIR,5) - 4.2 = 0$ $TIR_{(D-A)}$ = No hay TIR positiva

$RBC_{(D-A)}\ (18\%) = [0.8\ (P/S,18,5) - 3\ (P/S,18,5)] / 4.2 = 0.2272$

Los resultados anteriores indican que el proyecto $_{(D-A)}$ tiene:
$VPN_{(D-A)(}18\%) < 0$; $TIR_{(D-A)}$ = No hay TIR positiva y
RBC(D-A) (18%) < 1

por lo tanto el proyecto A es mejor y preferible a D o A > D

Jerarquizando los cuatro proyectos se tiene:
C > B > A > D

Por lo tanto:

- Si los proyectos son independientes y no existe limitación de capital se deberían recomendar los cuatro proyectos, pero si solamente pueden exportar tres productos se deben entonces recomendar los proyectos por orden de jerarquización C, B y A.
- Si los proyectos fueran mutuamente excluyentes, como no hay problema con su duración se recomendaría el proyecto C.

8.2. Proyectos con diferente vida útil

Otro problema que se plantea cuando se van a jerarquizar proyectos es cómo se pueden comparar dos proyectos que tienen diferente vida productiva. El análisis incremental o marginal ayuda a solucionar este problema. Se observa a través de un ejemplo.

Ejercicio: 8-02: Un productor de carne tiene dos alternativas para invertir y desea saber mediante el análisis conjunto del VPN y la TIR cuál de las dos es más conveniente en términos económicos. Dispone de la siguiente información, además de tener la posibilidad de invertir su dinero en un CDT que le paga el 15% anual efectivo.

Alternativa	Inversión inicial	Ingresos anuales	Costos anuales	Valores de salvamento	Vida útil
1	23	25	10	8	2
2	30	30	18	8	4

Cuadro 8-04: Flujos brutos de las alternativas, Ejercicio 8-02 (Millones $)

El análisis incremental en este caso incluye la jerarquización de dos alternativas con nivel de inversión y vidas productivas diferentes.

Los flujos netos de las dos alternativas son:

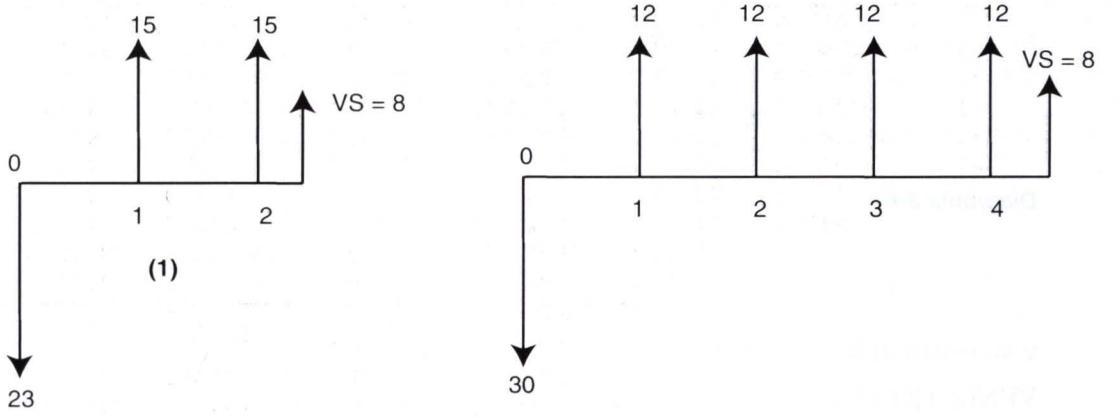


Diagrama 8-06

y los indicadores se pueden estimar así:

VPN1(15%) = 15 (S/R, 15, 2) + 8 (R/S, 15, 2) - 23 = 7.434787
VPN2(15%) 12 (S/R, 15, 4) + 8 (R/S, 15, 4) - 30 = 8.833760

15(P/S, TIR, 1) + 23(P/S, TIR, 2) - 23 = 0 TIR1= 37.79%
12(P/S, TIR, 3) + 23(P/S, TIR, 4) - 30 = 0 TIR2= 27.77%
RBC1(15%) = [15 (S/R, 15, 2) + 8 (R/S, 15, 2) / 23 = 1.3232
RBC2(15%) = [12 (S/R, 15, 4) + 8 (R/S, 15, 4) / 30 = 1.2944

Al jerarquizar las dos alternativas de acuerdo con los tres criterios se tiene:

Alternativa	VPN(15%)		TIR		RBC(15%)	
1	7.434787	II	37.79	I	1.3232	I
2	8.833760	I	27.77	II	1.2944	II

Cuadro 8-05: Jerarquización de alternativas, Ejercicio 8-02.

Puede apreciarse fácilmente que el VPN indica un camino y la TIR el camino contrario. Es importante entonces aplicar el análisis incremental para evitar dichas discrepancias.

Tenemos el proyecto (2-1) con una vida útil de cuatro años.

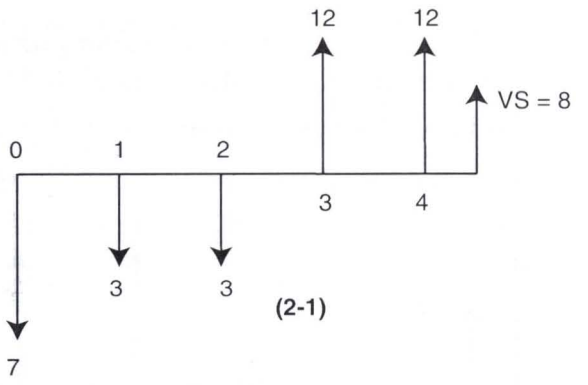


Diagrama 8-07

y se estiman los indicadores:

VPN(2-1)(15%) = 12(P/S, 15,2)(P/S, 15, 2) - 3(P/S, 15,2) - 7

= 12(1.690051)(1.690051) - 3 (1.690051) = 4.097429

12(P/R, TIR, 2)(P/S, TIR, 2) - 3(P/R, TIR,2) - 7 = 0 TIR(2-1)=24%

RBC(2-1)(15%) = [12(P/R, 15, 2)(P/R,15,2)] / [3(P/R, 15,2) + 7] = 1.34

El análisis incremental indica entonces que:

VPN(2-1)(15%) = 4.097429 > 0; TIR(2-1)=24% > i* =15% y

RBC(2-1)(15%) = 1.34 > 1

por lo tanto

Alternativa 2 > Alternativa 1

Conclusión: La alternativa 2 es mejor y preferible a la alternativa 1 en términos económicos y según los criterios de VPN, TIR y RBC. Esta misma conclusión se puede tener desde un principio, utilizando el criterio del VPN en forma directa. Esto nos sigue mostrando que a pesar de los inconvenientes que pueda tener el VPN, en especial en su estimación, es el más completo de los criterios de evaluación económica de proyectos.

ANEXOS

TABLA 0.5%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.995025	1.005000	0.995025	1.005000	1.000000	1.000000	1
2	0.990075	1.010025	1.985099	0.503753	2.005000	0.498753	2
3	0.985149	1.015075	2.970248	0.336672	3.015025	0.331672	3
4	0.980248	1.020151	3.950496	0.253133	4.030100	0.248133	4
5	0.975371	1.025251	4.925866	0.203010	5.050251	0.198010	5
6	0.970518	1.030378	5.896384	0.169595	6.075502	0.164595	6
7	0.965690	1.035529	6.862074	0.145729	7.105879	0.140729	7
8	0.960885	1.040707	7.822959	0.127829	8.141409	0.122829	8
9	0.956105	1.045911	8.779064	0.113907	9.182116	0.108907	9
10	0.951348	1.051140	9.730412	0.102771	10.228026	0.097771	10
11	0.946615	1.056396	10.677027	0.093659	11.279167	0.088659	11
12	0.941905	1.061678	11.618932	0.086066	12.335562	0.081066	12
13	0.937219	1.066986	12.556151	0.079642	13.397240	0.074642	13
14	0.932556	1.072321	13.488708	0.074136	14.464226	0.069136	14
15	0.927917	1.077683	14.416625	0.069364	15.536548	0.064364	15
16	0.923300	1.083071	15.339925	0.065189	16.614230	0.060189	16
17	0.918707	1.088487	16.258632	0.061506	17.697301	0.056506	17
18	0.914136	1.093929	17.172768	0.058232	18.785788	0.053232	18
19	0.909588	1.099399	18.082356	0.055303	19.879717	0.050303	19
20	0.905063	1.104896	18.987419	0.052666	20.979115	0.047666	20
21	0.900560	1.110420	19.887979	0.050282	22.084011	0.045282	21
22	0.896080	1.115972	20.784059	0.048114	23.194431	0.043114	22
23	0.891622	1.121552	21.675681	0.046135	24.310403	0.041135	23
24	0.887186	1.127160	22.562866	0.044321	25.431955	0.039321	24
25	0.882772	1.132796	23.445638	0.042652	26.559115	0.037652	25
26	0.878380	1.138460	24.324018	0.041112	27.691911	0.036112	26
27	0.874010	1.144152	25.198028	0.039686	28.830370	0.034686	27
28	0.869662	1.149873	26.067689	0.038362	29.974522	0.033362	28
29	0.865335	1.155622	26.933024	0.037129	31.124395	0.032129	29
30	0.861030	1.161400	27.794054	0.035979	32.280017	0.030979	30
33	0.848242	1.178908	30.351526	0.032947	35.781667	0.027947	33
36	0.835645	1.196681	32.871016	0.030422	39.336105	0.025422	36
39	0.823235	1.214721	35.353089	0.028286	42.944127	0.023286	39
42	0.811009	1.233033	37.798300	0.026456	46.606540	0.021456	42
45	0.798964	1.251621	40.207196	0.024871	50.324164	0.019871	45
48	0.787098	1.270489	42.580318	0.023485	54.097832	0.018485	48
51	0.775409	1.289642	44.918195	0.022263	57.928389	0.017263	51
54	0.763893	1.309083	47.221353	0.021177	61.816692	0.016177	54
57	0.752548	1.328818	49.490305	0.020206	65.763611	0.015206	57
60	0.741372	1.348850	51.725561	0.019333	69.770031	0.014333	60
90	0.638344	1.566555	72.331300	0.013825	113.310936	0.008825	90
120	0.549633	1.819397	90.073453	0.011102	163.879347	0.006102	120

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 1.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.990099	1.010000	0.990099	1.010000	1.000000	1.000000	1
2	0.980296	1.020100	1.970395	0.507512	2.010000	0.497512	2
3	0.970590	1.030301	2.940985	0.340022	3.030100	0.330022	3
4	0.960980	1.040604	3.901966	0.256281	4.060401	0.246281	4
5	0.951466	1.051010	4.853431	0.206040	5.101005	0.196040	5
6	0.942045	1.061520	5.795476	0.172548	6.152015	0.162548	6
7	0.932718	1.072135	6.728195	0.148628	7.213535	0.138628	7
8	0.923483	1.082857	7.651678	0.130690	8.285671	0.120690	8
9	0.914340	1.093685	8.566018	0.116740	9.368527	0.106740	9
10	0.905287	1.104622	9.471305	0.105582	10.462213	0.095582	10
11	0.896324	1.115668	10.367628	0.096454	11.566835	0.086454	11
12	0.887449	1.126825	11.255077	0.088849	12.682503	0.078849	12
13	0.878663	1.138093	12.133740	0.082415	13.809328	0.072415	13
14	0.869963	1.149474	13.003703	0.076901	14.947421	0.066901	14
15	0.861349	1.160969	13.865053	0.072124	16.096896	0.062124	15
16	0.852821	1.172579	14.717874	0.067945	17.257864	0.057945	16
17	0.844377	1.184304	15.562251	0.064258	18.430443	0.054258	17
18	0.836017	1.196147	16.398269	0.060982	19.614748	0.050982	18
19	0.827740	1.208109	17.226008	0.058052	20.810895	0.048052	19
20	0.819544	1.220190	18.045553	0.055415	22.019004	0.045415	20
21	0.811430	1.232392	18.856983	0.053031	23.239194	0.043031	21
22	0.803396	1.244716	19.660379	0.050864	24.471586	0.040864	22
23	0.795442	1.257163	20.455821	0.048886	25.716302	0.038886	23
24	0.787566	1.269735	21.243387	0.047073	26.973465	0.037073	24
25	0.779768	1.282432	22.023156	0.045407	28.243200	0.035407	25
26	0.772048	1.295256	22.795204	0.043869	29.525631	0.033869	26
27	0.764404	1.308209	23.559608	0.042446	30.820888	0.032446	27
28	0.756836	1.321291	24.316443	0.041124	32.129097	0.031124	28
29	0.749342	1.334504	25.065785	0.039895	33.450388	0.029895	29
30	0.741923	1.347849	25.807708	0.038748	34.784892	0.028748	30
33	0.720103	1.388690	27.989693	0.035727	38.869009	0.025727	33
36	0.698925	1.430769	30.107505	0.033214	43.076878	0.023214	36
39	0.678370	1.474123	32.163033	0.031092	47.412251	0.021092	39
42	0.658419	1.518790	34.158108	0.029276	51.878989	0.019276	42
45	0.639055	1.564811	36.094508	0.027705	56.481075	0.017705	45
48	0.620260	1.612226	37.973959	0.026334	61.222608	0.016334	48
51	0.602019	1.661078	39.798136	0.025127	66.107814	0.015127	51
54	0.584313	1.711410	41.568664	0.024057	71.141047	0.014057	54
57	0.567129	1.763268	43.287121	0.023102	76.326792	0.013102	57
60	0.550450	1.816697	44.955038	0.022244	81.669670	0.012244	60
90	0.408391	2.448633	59.160881	0.016903	144.863267	0.006903	90
120	0.302995	3.300387	69.700522	0.014347	230.038689	0.004347	120

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n-1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 1.5%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.985222	1.015000	0.985222	1.015000	1.000000	1.000000	1
2	0.970662	1.030225	1.955883	0.511278	2.015000	0.496278	2
3	0.956317	1.045678	2.912200	0.343383	3.045225	0.328383	3
4	0.942184	1.061364	3.854385	0.259445	4.090903	0.244445	4
5	0.928260	1.077284	4.782645	0.209089	5.152267	0.194089	5
6	0.914542	1.093443	5.697187	0.175525	6.229551	0.160525	6
7	0.901027	1.109845	6.598214	0.151556	7.322994	0.136556	7
8	0.887711	1.126493	7.485925	0.133584	8.432839	0.118584	8
9	0.874592	1.143390	8.360517	0.119610	9.559332	0.104610	9
10	0.861667	1.160541	9.222185	0.108434	10.702722	0.093434	10
11	0.848933	1.177949	10.071118	0.099294	11.863262	0.084294	11
12	0.836387	1.195618	10.907505	0.091680	13.041211	0.076680	12
13	0.824027	1.213552	11.731532	0.085240	14.236830	0.070240	13
14	0.811849	1.231756	12.543382	0.079723	15.450382	0.064723	14
15	0.799852	1.250232	13.343233	0.074944	16.682138	0.059944	15
16	0.788031	1.268986	14.131264	0.070765	17.932370	0.055765	16
17	0.776385	1.288020	14.907649	0.067080	19.201355	0.052080	17
18	0.764912	1.307341	15.672561	0.063806	20.489376	0.048806	18
19	0.753607	1.326951	16.426168	0.060878	21.796716	0.045878	19
20	0.742470	1.346855	17.168639	0.058246	23.123667	0.043246	20
21	0.731498	1.367058	17.900137	0.055865	24.470522	0.040865	21
22	0.720688	1.387564	18.620824	0.053703	25.837580	0.038703	22
23	0.710037	1.408377	19.330861	0.051731	27.225144	0.036731	23
24	0.699544	1.429503	20.030405	0.049924	28.633521	0.034924	24
25	0.689206	1.450945	20.719611	0.048263	30.063024	0.033263	25
26	0.679021	1.472710	21.398632	0.046732	31.513969	0.031732	26
27	0.668986	1.494800	22.067617	0.045315	32.986678	0.030315	27
28	0.659099	1.517222	22.726717	0.044001	34.481479	0.029001	28
29	0.649359	1.539981	23.376076	0.042779	35.998701	0.027779	29
30	0.639762	1.563080	24.015838	0.041639	37.538681	0.026639	30
33	0.611816	1.634479	25.878954	0.038641	42.298612	0.023641	33
36	0.585090	1.709140	27.660684	0.036152	47.275969	0.021152	36
39	0.559531	1.787210	29.364583	0.034055	52.480684	0.019055	39
42	0.535089	1.868847	30.994050	0.032264	57.923141	0.017264	42
45	0.511715	1.954213	32.552337	0.030720	63.614201	0.015720	45
48	0.489362	2.043478	34.042554	0.029375	69.565219	0.014375	48
51	0.467985	2.136821	35.467673	0.028195	75.788070	0.013195	51
54	0.447542	2.234428	36.830539	0.027151	82.295171	0.012151	54
57	0.427992	2.336493	38.133871	0.026223	89.099506	0.011223	57
60	0.409296	2.443220	39.380269	0.025393	96.214652	0.010393	60
90	0.261852	3.818949	49.209855	0.020321	187.929900	0.005321	90
120	0.167523	5.969323	55.498454	0.018019	331.288191	0.003019	120

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 2.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.980392	1.020000	0.980392	1.020000	1.000000	1.000000	1
2	0.961169	1.040400	1.941561	0.515050	2.020000	0.495050	2
3	0.942322	1.061208	2.883883	0.346755	3.060400	0.326755	3
4	0.923845	1.082432	3.807729	0.262624	4.121608	0.242624	4
5	0.905731	1.104081	4.713460	0.212158	5.204040	0.192158	5
6	0.887971	1.126162	5.601431	0.178526	6.308121	0.158526	6
7	0.870560	1.148686	6.471991	0.154512	7.434283	0.134512	7
8	0.853490	1.171659	7.325481	0.136510	8.582969	0.116510	8
9	0.836755	1.195093	8.162237	0.122515	9.754628	0.102515	9
10	0.820348	1.218994	8.982585	0.111327	10.949721	0.091327	10
11	0.804263	1.243374	9.786848	0.102178	12.168715	0.082178	11
12	0.788493	1.268242	10.575341	0.094560	13.412090	0.074560	12
13	0.773033	1.293607	11.348374	0.088118	14.680332	0.068118	13
14	0.757875	1.319479	12.106249	0.082602	15.973938	0.062602	14
15	0.743015	1.345868	12.849264	0.077825	17.293417	0.057825	15
16	0.728446	1.372786	13.577709	0.073650	18.639285	0.053650	16
17	0.714163	1.400241	14.291872	0.069970	20.012071	0.049970	17
18	0.700159	1.428246	14.992031	0.06702	21.412312	0.046702	18
19	0.686431	1.456811	15.678462	0.063782	22.840559	0.043782	19
20	0.672971	1.485947	16.351433	0.061157	24.297370	0.041157	20
21	0.659776	1.515666	17.011209	0.058785	25.783317	0.038785	21
22	0.646839	1.545980	17.658048	0.056631	27.298984	0.036631	22
23	0.634156	1.576899	18.292204	0.054668	28.844963	0.034668	23
24	0.621721	1.608437	18.913926	0.052871	30.421862	0.032871	24
25	0.609531	1.640606	19.523456	0.051220	32.030300	0.031220	25
26	0.597579	1.673418	20.121036	0.049699	33.670906	0.029699	26
27	0.585862	1.706886	20.706898	0.048293	35.344324	0.028293	27
28	0.574375	1.741024	21.281272	0.046990	37.051210	0.026990	28
29	0.563112	1.775845	21.844385	0.045778	38.792235	0.025778	29
30	0.552071	1.811362	22.396456	0.044650	40.568079	0.024650	30
33	0.520229	1.922231	23.988564	0.041687	46.111570	0.021687	33
36	0.490223	2.039887	25.488842	0.039233	51.994367	0.019233	36
39	0.461948	2.164745	26.902589	0.037171	58.237238	0.017171	39
42	0.435304	2.297244	28.234794	0.035417	64.862223	0.015417	42
45	0.410197	2.437854	29.490160	0.033910	71.892710	0.013910	45
48	0.386538	2.587070	30.673120	0.032602	79.353519	0.012602	48
51	0.364243	2.745420	31.787849	0.031459	87.270989	0.011459	51
54	0.343234	2.913461	32.838283	0.030452	95.673072	0.010452	54
57	0.323437	3.091789	33.828131	0.029561	104.589430	0.009561	57
60	0.304782	3.281031	34.760887	0.028768	114.051539	0.008768	60
90	0.168261	5.943133	41.586929	0.024046	247.156656	0.004046	90
120	0.092892	10.765163	45.355389	0.022048	488.258152	0.002048	120

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P:$(1+i)^n$ P/R:$[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 2.5%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.975610	1.025000	0.975610	1.025000	1.000000	1.000000	1
2	0.951814	1.050625	1.927424	0.518827	2.025000	0.493827	2
3	0.928599	1.076891	2.856024	0.350137	3.075625	0.325137	3
4	0.905951	1.103813	3.761974	0.265818	4.152516	0.240818	4
5	0.883854	1.131408	4.645828	0.215247	5.256329	0.190247	5
6	0.862297	1.159693	5.508125	0.181550	6.387737	0.156550	6
7	0.841265	1.188686	6.349391	0.157495	7.547430	0.132495	7
8	0.820747	1.218403	7.170137	0.139467	8.736116	0.114467	8
9	0.800728	1.248863	7.970866	0.125457	9.954519	0.100457	9
10	0.781198	1.280085	8.752064	0.114259	11.203382	0.089259	10
11	0.762145	1.312087	9.514209	0.105106	12.483466	0.080106	11
12	0.743556	1.344889	10.257765	0.097487	13.795553	0.072487	12
13	0.725420	1.378511	10.983185	0.091048	15.140442	0.066048	13
14	0.707727	1.412974	11.690912	0.085537	16.518953	0.060537	14
15	0.690466	1.448298	12.381378	0.080766	17.931927	0.055766	15
16	0.673625	1.484506	13.055003	0.076599	19.380225	0.051599	16
17	0.657195	1.521618	13.712198	0.072928	20.864730	0.047928	17
18	0.641166	1.559659	14.353364	0.069670	22.386349	0.044670	18
19	0.625528	1.598650	14.978891	0.066761	23.946007	0.041761	19
20	0.610271	1.638616	15.589162	0.064147	25.544658	0.039147	20
21	0.595386	1.679582	16.184549	0.061787	27.183274	0.036787	21
22	0.580865	1.721571	16.765413	0.059647	28.862856	0.034647	22
23	0.566697	1.764611	17.332110	0.057696	30.584427	0.032696	23
24	0.552875	1.808726	17.884986	0.055913	32.349038	0.030913	24
25	0.539391	1.853944	18.424376	0.054276	34.157764	0.029276	25
26	0.526235	1.900293	18.950611	0.052769	36.011708	0.027769	26
27	0.513400	1.947800	19.464011	0.051377	37.912001	0.026377	27
28	0.500878	1.996495	19.964889	0.050088	39.859801	0.025088	28
29	0.488661	2.046407	20.453550	0.048891	41.856296	0.023891	29
30	0.476743	2.097568	20.930293	0.047778	43.902703	0.022778	30
33	0.442703	2.258851	22.291881	0.044859	50.354034	0.019859	33
36	0.411094	2.432535	23.556251	0.042452	57.301413	0.017452	36
39	0.381741	2.619574	24.730344	0.040436	64.782979	0.015436	39
42	0.354485	2.820995	25.820607	0.038729	72.839808	0.013729	42
45	0.329174	3.037903	26.833024	0.037268	81.516131	0.012268	45
48	0.305671	3.271490	27.773154	0.036006	90.859582	0.011006	48
51	0.283846	3.523036	28.646158	0.034909	100.921458	0.009909	51
54	0.263579	3.793925	29.456829	0.033948	111.756996	0.008948	54
57	0.244760	4.085642	30.209617	0.033102	123.425687	0.008102	57
60	0.227284	4.399790	30.908656	0.032353	135.991590	0.007353	60
90	0.108356	9.228856	35.665768	0.028038	329.154253	0.003038	90
120	0.051658	19.358150	37.933687	0.026362	734.325993	0.001362	120

FACTORES

P/S:$1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 3.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.970874	1.030000	0.970874	1.030000	1.000000	1.000000	1
2	0.942596	1.060900	1.913470	0.522611	2.030000	0.492611	2
3	0.915142	1.092727	2.828611	0.353530	3.090900	0.323530	3
4	0.888487	1.125509	3.717098	0.269027	4.183627	0.239027	4
5	0.862609	1.159274	4.579707	0.218355	5.309136	0.188355	5
6	0.837484	1.194052	5.417191	0.184598	6.468410	0.154598	6
7	0.813092	1.229874	6.230283	0.160506	7.662462	0.130506	7
8	0.789409	1.266770	7.019692	0.142456	8.892336	0.112456	8
9	0.766417	1.304773	7.786109	0.128434	10.159106	0.098434	9
10	0.744094	1.343916	8.530203	0.117231	11.463879	0.087231	10
11	0.722421	1.384234	9.252624	0.108077	12.807796	0.078077	11
12	0.701380	1.425761	9.954004	0.100462	14.192030	0.070462	12
13	0.680951	1.468534	10.634955	0.094030	15.617790	0.064030	13
14	0.661118	1.512590	11.296073	0.088526	17.086324	0.058526	14
15	0.641862	1.557967	11.937935	0.083767	18.598914	0.053767	15
16	0.623167	1.604706	12.561102	0.079611	20.156881	0.049611	16
17	0.605016	1.652848	13.166118	0.075953	21.761588	0.045953	17
18	0.587395	1.702433	13.753513	0.072709	23.414435	0.042709	18
19	0.570286	1.753506	14.323799	0.069814	25.116868	0.039814	19
20	0.553676	1.806111	14.877475	0.067216	26.870374	0.037216	20
21	0.537549	1.860295	15.415024	0.064872	28.676486	0.034872	21
22	0.521893	1.916103	15.936917	0.062747	30.536780	0.032747	22
23	0.506692	1.973587	16.443608	0.060814	32.452884	0.030814	23
24	0.491934	2.032794	16.935542	0.059047	34.426470	0.029047	24
25	0.477606	2.093778	17.413148	0.057428	36.459264	0.027428	25
26	0.463695	2.156591	17.876842	0.055938	38.553042	0.025938	26
27	0.450189	2.221289	18.327031	0.054564	40.709634	0.024564	27
28	0.437077	2.287928	18.764108	0.053293	42.930923	0.023293	28
29	0.424346	2.356566	19.188455	0.052115	45.218850	0.022115	29
30	0.411987	2.427262	19.600441	0.051019	47.575416	0.021019	30
33	0.377026	2.652335	20.765792	0.048156	55.077841	0.018156	33
36	0.345032	2.898278	21.832252	0.045804	63.275944	0.015804	36
39	0.315754	3.167027	22.808215	0.043844	72.234233	0.013844	39
42	0.288959	3.460696	23.701359	0.042192	82.023196	0.012192	42
45	0.264439	3.781596	24.518713	0.040785	92.719861	0.010785	45
48	0.241999	4.132252	25.266707	0.039578	104.408396	0.009578	48
51	0.221463	4.515423	25.951227	0.038534	117.180773	0.008534	51
54	0.202670	4.934125	26.577660	0.037626	131.137495	0.007626	54
57	0.185472	5.391651	27.150936	0.036831	146.388381	0.006831	57
60	0.169733	5.891603	27.675564	0.036133	163.053437	0.006133	60
90	0.069928	14.300467	31.002407	0.032256	443.348904	0.002256	90
120	0.028809	34.710987	32.373023	0.030890	1123.699571	0.000890	120

FACTORES

P/S: $1/(1+i)^n$ R/P:$[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 4.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.961538	1.040000	0.961538	1.040000	1.000000	1.000000	1
2	0.924556	1.081600	1.886095	0.530196	2.040000	0.490196	2
3	0.888996	1.124864	2.775091	0.360349	3.121600	0.320349	3
4	0.854804	1.169859	3.629895	0.275490	4.246464	0.235490	4
5	0.821927	1.216653	4.451822	0.224627	5.416323	0.184627	5
6	0.790315	1.265319	5.242137	0.190762	6.632975	0.150762	6
7	0.759918	1.315932	6.002055	0.166610	7.898294	0.126610	7
8	0.730690	1.368569	6.732745	0.148528	9.214226	0.108528	8
9	0.702587	1.423312	7.435332	0.134493	10.582795	0.094493	9
10	0.675564	1.480244	8.110896	0.123291	12.006107	0.083291	10
11	0.649581	1.539454	8.760477	0.114149	13.486351	0.074149	11
12	0.624597	1.601032	9.385074	0.106552	15.025805	0.066552	12
13	0.600574	1.665074	9.985648	0.100144	16.626838	0.060144	13
14	0.577475	1.731676	10.563123	0.094669	18.291911	0.054669	14
15	0.555265	1.800944	11.118387	0.089941	20.023588	0.049941	15
16	0.533908	1.872981	11.652296	0.085820	21.824531	0.045820	16
17	0.513373	1.947900	12.165669	0.082199	23.697512	0.042199	17
18	0.493628	2.025817	12.659297	0.078993	25.645413	0.038993	18
19	0.474642	2.106849	13.133939	0.076139	27.671229	0.036139	19
20	0.456387	2.191123	13.590326	0.073582	29.778079	0.033582	20
21	0.438834	2.278768	14.029160	0.071280	31.969202	0.031280	21
22	0.421955	2.369919	14.451115	0.069199	34.247970	0.029199	22
23	0.405726	2.464716	14.856842	0.067309	36.617889	0.027309	23
24	0.390121	2.563304	15.246963	0.065587	39.082604	0.025587	24
25	0.375117	2.665836	15.622080	0.064012	41.645908	0.024012	25
26	0.360689	2.772470	15.982769	0.062567	44.311745	0.022567	26
27	0.346817	2.883369	16.329586	0.061239	47.084214	0.021239	27
28	0.333477	2.998703	16.663063	0.060013	49.967583	0.020013	28
29	0.320651	3.118651	16.983715	0.058880	52.966286	0.018880	29
30	0.308319	3.243398	17.292033	0.057830	56.084938	0.017830	30
33	0.274094	3.648381	18.147646	0.055104	66.209527	0.015104	33
36	0.243669	4.103933	18.908282	0.052887	77.598314	0.012887	36
39	0.216621	4.616366	19.584485	0.051061	90.409150	0.011061	39
42	0.192575	5.192784	20.185627	0.049540	104.819598	0.009540	42
45	0.171198	5.841176	20.720040	0.048262	121.029392	0.008262	45
48	0.152195	6.570528	21.195131	0.047181	139.263206	0.007181	48
51	0.135301	7.390951	21.617485	0.046259	159.773767	0.006259	51
54	0.120282	8.313814	21.992957	0.045469	182.845359	0.005469	54
57	0.106930	9.351910	22.326749	0.044789	208.797762	0.004789	57
60	0.095060	10.519627	22.623490	0.044202	237.990685	0.004202	60
90	0.029309	34.119333	24.267278	0.041208	827.983334	0.001208	90
120	0.009036	110.662561	24.774088	0.040365	2741.564020	0.000365	120

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 5.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.952381	1.050000	0.952381	1.050000	1.000000	1.000000	1
2	0.907029	1.102500	1.859410	0.537805	2.050000	0.487805	2
3	0.863838	1.157625	2.723248	0.367209	3.152500	0.317209	3
4	0.822702	1.215506	3.545951	0.282012	4.310125	0.232012	4
5	0.783526	1.276282	4.329477	0.230975	5.525631	0.180975	5
6	0.746215	1.340096	5.075692	0.197017	6.801913	0.147017	6
7	0.710681	1.407100	5.786373	0.172820	8.142008	0.122820	7
8	0.676839	1.477455	6.463213	0.154722	9.549109	0.104722	8
9	0.644609	1.551328	7.107822	0.140690	11.026564	0.090690	9
10	0.613913	1.628895	7.721735	0.129505	12.577893	0.079505	10
11	0.584679	1.710339	8.306414	0.120389	14.206787	0.070389	11
12	0.556837	1.795856	8.863252	0.112825	15.917127	0.062825	12
13	0.530321	1.885649	9.393573	0.106456	17.712983	0.056456	13
14	0.505068	1.979932	9.898641	0.101024	19.598632	0.051024	14
15	0.481017	2.078928	10.379658	0.096342	21.578564	0.046342	15
16	0.458112	2.182875	10.837770	0.092270	23.657492	0.042270	16
17	0.436297	2.292018	11.274066	0.088699	25.840366	0.038699	17
18	0.415521	2.406619	11.689587	0.085546	28.132385	0.035546	18
19	0.395734	2.526950	12.085321	0.082745	30.539004	0.032745	19
20	0.376889	2.653298	12.462210	0.080243	33.065954	0.030243	20
21	0.358942	2.785963	12.821153	0.077996	35.719252	0.027996	21
22	0.341850	2.925261	13.163003	0.075971	38.505214	0.025971	22
23	0.325571	3.071524	13.488574	0.074137	41.430475	0.024137	23
24	0.310068	3.225100	13.798642	0.072471	44.501999	0.022471	24
25	0.295303	3.386355	14.093945	0.070952	47.727099	0.020952	25
26	0.281241	3.555673	14.375185	0.069564	51.113454	0.019564	26
27	0.267848	3.733456	14.643034	0.068292	54.669126	0.018292	27
28	0.255094	3.920129	14.898127	0.067123	58.402583	0.017123	28
29	0.242946	4.116136	15.141074	0.066046	62.322712	0.016046	29
30	0.231377	4.321942	15.372451	0.065051	66.438848	0.015051	30
33	0.199873	5.003189	16.002549	0.062490	80.063771	0.012490	33
36	0.172657	5.791816	16.546852	0.060434	95.836323	0.010434	36
39	0.149148	6.704751	17.017041	0.058765	114.095023	0.008765	39
42	0.128840	7.761588	17.423208	0.057395	135.231751	0.007395	42
45	0.111297	8.985008	17.774070	0.056262	159.700156	0.006262	45
48	0.096142	10.401270	18.077158	0.055318	188.025393	0.005318	48
51	0.083051	12.040770	18.338977	0.054529	220.815396	0.004529	51
54	0.071743	13.938696	18.565146	0.053864	258.773922	0.003864	54
57	0.061974	16.135783	18.760519	0.053303	302.715662	0.003303	57
60	0.053536	18.679186	18.929290	0.052828	353.583718	0.002828	60
90	0.012387	80.730365	19.752262	0.050627	1594.607301	0.000627	90
120	0.002866	348.911986	19.942679	0.050144	6958.239713	0.000144	120

FACTORES

P/S: $1/(1+i)^n$ R/P:$[i(1+i)n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 6.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.943396	1.060000	0.943396	1.060000	1.000000	1.000000	1
2	0.889996	1.123600	1.833393	0.545437	2.060000	0.485437	2
3	0.839619	1.191016	2.673012	0.374110	3.183600	0.314110	3
4	0.792094	1.262477	3.465106	0.288591	4.374616	0.228591	4
5	0.747258	1.338226	4.212364	0.237396	5.637093	0.177396	5
6	0.704961	1.418519	4.917324	0.203363	6.975319	0.143363	6
7	0.665057	1.503630	5.582381	0.179135	8.393838	0.119135	7
8	0.627412	1.593848	6.209794	0.161036	9.897468	0.101036	8
9	0.591898	1.689479	6.801692	0.147022	11.491316	0.087022	9
10	0.558395	1.790848	7.360087	0.135868	13.180795	0.075868	10
11	0.526788	1.898299	7.886875	0.126793	14.971643	0.066793	11
12	0.496969	2.012196	8.383844	0.119277	16.869941	0.059277	12
13	0.468839	2.132928	8.852683	0.112960	18.882138	0.052960	13
14	0.442301	2.260904	9.294984	0.107585	21.015066	0.047585	14
15	0.417265	2.396558	9.712249	0.102963	23.275970	0.042963	15
16	0.393646	2.540352	10.105895	0.098952	25.672528	0.038952	16
17	0.371364	2.692773	10.477260	0.095445	28.212880	0.035445	17
18	0.350344	2.854339	10.827603	0.092357	30.905653	0.032357	18
19	0.330513	3.025600	11.158116	0.089621	33.759992	0.029621	19
20	0.311805	3.207135	11.469921	0.087185	36.785591	0.027185	20
21	0.294155	3.399564	11.764077	0.085005	39.992727	0.025005	21
22	0.277505	3.603537	12.041582	0.083046	43.392290	0.023046	22
23	0.261797	3.819750	12.303379	0.081278	46.995828	0.021278	23
24	0.246979	4.048935	12.550358	0.079679	50.815577	0.019679	24
25	0.232999	4.291871	12.783356	0.078227	54.864512	0.018227	25
26	0.219810	4.549383	13.003166	0.076904	59.156383	0.016904	26
27	0.207368	4.822346	13.210534	0.075697	63.705766	0.015697	27
28	0.195630	5.111687	13.406164	0.074593	68.528112	0.014593	28
29	0.184557	5.418388	13.590721	0.073580	73.639798	0.013580	29
30	0.174110	5.743491	13.764831	0.072649	79.058186	0.012649	30
33	0.146186	6.840590	14.230230	0.070273	97.343165	0.010273	33
36	0.122741	8.147252	14.620987	0.068395	119.120867	0.008395	36
39	0.103056	9.703507	14.949075	0.066894	145.058458	0.006894	39
42	0.086527	11.557033	15.224543	0.065683	175.950545	0.005683	42
45	0.072650	13.764611	15.455832	0.064700	212.743514	0.004700	45
48	0.060998	16.393872	15.650027	0.063898	256.564529	0.003898	48
51	0.051215	19.525364	15.813076	0.063239	308.756059	0.003239	51
54	0.043001	23.255020	15.949976	0.062696	370.917006	0.002696	54
57	0.036105	27.697101	16.064919	0.062247	444.951689	0.002247	57
60	0.030314	32.987691	16.161428	0.061876	533.128181	0.001876	60
90	0.005278	189.464511	16.578699	0.060318	3141.075187	0.000318	90
120	0.000919	1088.187748	16.651351	0.060055	18119.795797	0.000055	120

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 8.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.925926	1.080000	0.925926	1.080000	1.000000	1.000000	1
2	0.857339	1.166400	1.783265	0.560769	2.080000	0.480769	2
3	0.793832	1.259712	2.577097	0.388034	3.246400	0.308034	3
4	0.735030	1.360489	3.312127	0.301921	4.506112	0.221921	4
5	0.680583	1.469328	3.992710	0.250456	5.866601	0.170456	5
6	0.630170	1.586874	4.622880	0.216315	7.335929	0.136315	6
7	0.583490	1.713824	5.206370	0.192072	8.922803	0.112072	7
8	0.540269	1.850930	5.746639	0.174015	10.636628	0.094015	8
9	0.500249	1.999005	6.246888	0.160080	12.487558	0.080080	9
10	0.463193	2.158925	6.710081	0.149029	14.486562	0.069029	10
11	0.428883	2.331639	7.138964	0.140076	16.645487	0.060076	11
12	0.397114	2.518170	7.536078	0.132695	18.977126	0.052695	12
13	0.367698	2.719624	7.903776	0.126522	21.495297	0.046522	13
14	0.340461	2.937194	8.244237	0.121297	24.214920	0.041297	14
15	0.315242	3.172169	8.559479	0.116830	27.152114	0.036830	15
16	0.291890	3.425943	8.851369	0.112977	30.324283	0.032977	16
17	0.270269	3.700018	9.121638	0.109629	33.750226	0.029629	17
18	0.250249	3.996019	9.371887	0.106702	37.450244	0.026702	18
19	0.231712	4.315701	9.603599	0.104128	41.446263	0.024128	19
20	0.214548	4.660957	9.818147	0.101852	45.761964	0.021852	20
21	0.198656	5.033834	10.016803	0.099832	50.422921	0.019832	21
22	0.183941	5.436540	10.200744	0.098032	55.456755	0.018032	22
23	0.170315	5.871464	10.371059	0.096422	60.893296	0.016422	23
24	0.157699	6.341181	10.528758	0.094978	66.764759	0.014978	24
25	0.146018	6.848475	10.674776	0.093679	73.105940	0.013679	25
26	0.135202	7.396353	10.809978	0.092507	79.954415	0.012507	26
27	0.125187	7.988061	10.935165	0.091448	87.350768	0.011448	27
28	0.115914	8.627106	11.051078	0.090489	95.338830	0.010489	28
29	0.107328	9.317275	11.158406	0.089619	103.965936	0.009619	29
30	0.099377	10.062657	11.257783	0.088827	113.283211	0.008827	30
33	0.078889	12.676050	11.513888	0.086852	145.950620	0.006852	33
36	0.062625	15.968172	11.717193	0.085345	17.102148	0.005345	36
39	0.049713	20.115298	11.878582	0.084185	238.941221	0.004185	39
42	0.039464	25.339482	12.006699	0.083287	304.243523	0.003287	42
45	0.031328	31.920449	12.108402	0.082587	386.505617	0.002587	45
48	0.024869	40.210573	12.189136	0.082040	490.132164	0.002040	48
51	0.019742	50.653742	12.253227	0.081611	620.671769	0.001611	51
54	0.015672	63.809126	12.304103	0.081274	785.114075	0.001274	54
57	0.012441	80.381122	12.344491	0.081008	992.264022	0.001008	57
60	0.009876	101.257064	12.376552	0.080798	1253.213296	0.000798	60
90	0.000981	1018.91509	12.487732	0.080079	12723.938616	0.000079	90
120	0.000098	10252.99294	12.498781	0.080008	128149.91178	0.000008	120

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 9.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.917431	1.090000	0.917431	1.090000	1.000000	1.000000	1
2	0.841680	1.188100	1.759111	0.568469	2.090000	0.478469	2
3	0.772183	1.295029	2.531295	0.395055	3.278100	0.305055	3
4	0.708425	1.411582	3.239720	0.308669	4.573129	0.218669	4
5	0.649931	1.538624	3.889651	0.257092	5.984711	0.167092	5
6	0.596267	1.677100	4.485919	0.222920	7.523335	0.132920	6
7	0.547034	1.828039	5.032953	0.198691	9.200435	0.108691	7
8	0.501866	1.992563	5.534819	0.180674	11.028474	0.090674	8
9	0.460428	2.171893	5.995247	0.166799	13.021036	0.076799	9
10	0.422411	2.367364	6.417658	0.155820	15.192930	0.065820	10
11	0.387533	2.580426	6.805191	0.146947	17.560293	0.056947	11
12	0.355535	2.812665	7.160725	0.139651	20.140720	0.049651	12
13	0.326179	3.065805	7.486904	0.133567	22.953385	0.043567	13
14	0.299246	3.341727	7.786150	0.128433	26.019189	0.038433	14
15	0.274538	3.642482	8.060688	0.124059	29.360916	0.034059	15
16	0.251870	3.970306	8.312558	0.120300	33.003399	0.030300	16
17	0.231073	4.327633	8.543631	0.117046	36.973705	0.027046	17
18	0.211994	4.717120	8.755625	0.114212	41.301338	0.024212	18
19	0.194490	5.141661	8.950115	0.111730	46.018458	0.021730	19
20	0.178431	5.604411	9.128546	0.109546	51.160120	0.019546	20
21	0.163698	6.108808	9.292244	0.107617	56.764530	0.017617	21
22	0.150182	6.658600	9.442425	0.105905	62.873338	0.015905	22
23	0.137781	7.257874	9.580207	0.104382	69.531939	0.014382	23
24	0.126405	7.911083	9.706612	0.103023	76.789813	0.013023	24
25	0.115968	8.623081	9.822580	0.101806	84.700896	0.011806	25
26	0.106393	9.399158	9.928972	0.100715	93.323977	0.010715	26
27	0.097608	10.245082	10.026580	0.099735	102.723135	0.009735	27
28	0.089548	11.167140	10.116128	0.098852	112.968217	0.008852	28
29	0.082155	12.172182	10.198283	0.098056	124.135356	0.008056	29
30	0.075371	13.267678	10.273654	0.097336	136.307539	0.007336	30
33	0.058200	17.182028	10.464441	0.095562	179.800315	0.005562	33
36	0.044941	22.251225	10.611763	0.094235	236.124723	0.004235	36
39	0.034703	28.815982	10.725523	0.093236	309.066463	0.003236	39
42	0.026797	37.317532	10.813366	0.092478	403.528133	0.002478	42
45	0.020692	48.327286	10.881197	0.091902	525.858734	0.001902	45
48	0.015978	62.585237	10.933575	0.091461	684.280411	0.001461	48
51	0.012338	81.049697	10.974021	0.091124	889.441076	0.001124	51
54	0.009527	104.961708	11.005252	0.090866	1155.13009	0.000866	54
57	0.007357	135.928456	11.029369	0.090667	1499.20506	0.000667	57
60	0.005681	176.031292	11.047991	0.090514	1944.79213	0.000514	60
90	0.000428	2335.52658	11.10635	0.090039	25939.184	0.000039	90
120	0.000032	30987.0157	11.11075	0.090003	344289.06	0.000003	120

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 10.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.909091	1.100000	0.909091	1.100000	1.000000	1.000000	1
2	0.826446	1.210000	1.735537	0.576190	2.100000	0.476190	2
3	0.751315	1.331000	2.486852	0.402115	3.310000	0.302115	3
4	0.683013	1.464100	3.169865	0.315471	4.641000	0.215471	4
5	0.620921	1.610510	3.790787	0.263797	6.105100	0.163797	5
6	0.564474	1.771561	4.355261	0.229607	7.715610	0.129607	6
7	0.513158	1.948717	4.868419	0.205405	9.487171	0.105405	7
8	0.466507	2.143589	5.334926	0.187444	11.435888	0.087444	8
9	0.424098	2.357948	5.759024	0.173641	13.579477	0.073641	9
10	0.385543	2.593742	6.144567	0.162745	15.937425	0.062745	10
11	0.350494	2.853117	6.495061	0.153963	18.531167	0.053963	11
12	0.318631	3.138428	6.813692	0.146763	21.384284	0.046763	12
13	0.289664	3.452271	7.103356	0.140779	24.522712	0.040779	13
14	0.263331	3.797498	7.366687	0.135746	27.974983	0.035746	14
15	0.239392	4.177248	7.606080	0.131474	31.772482	0.031474	15
16	0.217629	4.594973	7.823709	0.127817	35.949730	0.027817	16
17	0.197845	5.054470	8.021553	0.124664	40.544703	0.024664	17
18	0.179859	5.559917	8.201412	0.121930	45.599173	0.021930	18
19	0.163508	6.115909	8.364920	0.119547	51.159090	0.019547	19
20	0.148644	6.727500	8.513564	0.117460	57.274999	0.017460	20
21	0.135131	7.400250	8.648694	0.115624	64.002499	0.015624	21
22	0.122846	8.140275	8.771540	0.114005	71.402749	0.014005	22
23	0.111678	8.954302	8.883218	0.112572	79.543024	0.012572	23
24	0.101526	9.849733	8.984744	0.111300	88.497327	0.011300	24
25	0.092296	10.834706	9.077040	0.110168	98.347059	0.010168	25
26	0.083905	11.918177	9.160945	0.109159	109.181765	0.009159	26
27	0.076278	13.109994	9.237223	0.108258	121.099942	0.008258	27
28	0.069343	14.420994	9.306567	0.107451	134.209936	0.007451	28
29	0.063039	15.863093	9.369606	0.106728	148.630930	0.006728	29
30	0.057309	17.449402	9.426914	0.106079	164.494023	0.006079	30
33	0.043057	23.225154	9.569432	0.104499	222.251544	0.004499	33
36	0.032349	30.912681	9.676508	0.103343	299.126805	0.003343	36
39	0.024304	41.144778	9.756956	0.102491	401.447778	0.002491	39
42	0.018260	54.763699	9.817397	0.101860	537.636992	0.001860	42
45	0.013719	72.890484	9.862808	0.101391	718.904837	0.001391	45
48	0.010307	97.017234	9.896926	0.101041	960.172338	0.001041	48
51	0.007744	129.129938	9.922559	0.100780	1281.299382	0.000780	51
54	0.005818	171.871948	9.941817	0.100585	1708.719477	0.000585	54
57	0.004371	228.761562	9.956286	0.100439	2277.615624	0.000439	57
60	0.003284	304.481640	9.967157	0.100330	3034.816395	0.000330	60
90	0.000188	5313.022612	9.998118	0.100019	53120.22612	0.000019	90
120	0.000011	92709.06882	9.999892	0.100001	927080.688	0.000001	120

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 12.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N P/S	S/P	P/R	R/P	S/R	R/S	N	
1	0.892857	1.120000	0.892857	1.120000	1.000000	1.000000	1
2	0.797194	1.254400	1.690051	0.591698	2.120000	0.471698	2
3	0.711780	1.404928	2.401831	0.416349	3.374400	0.296349	3
4	0.635518	1.573519	3.037349	0.329234	4.779328	0.209234	4
5	0.567427	1.762342	3.604776	0.277410	6.352847	0.157410	5
6	0.506631	1.973823	4.111407	0.243226	8.115189	0.123226	6
7	0.452349	2.210681	4.563757	0.219118	10.089012	0.099118	7
8	0.403883	2.475963	4.967640	0.201303	12.299693	0.081303	8
9	0.360610	2.773079	5.328250	0.187679	14.775656	0.067679	9
10	0.321973	3.105848	5.650223	0.176984	17.548735	0.056984	10
11	0.287476	3.478550	5.937699	0.168415	20.654583	0.048415	11
12	0.256675	3.895976	6.194374	0.161437	24.133133	0.041437	12
13	0.229174	4.363493	6.423548	0.155677	28.029109	0.035677	13
14	0.204620	4.887112	6.628168	0.150871	32.392602	0.030871	14
15	0.182696	5.473566	6.810864	0.146824	37.279715	0.026824	15
16	0.163122	6.130394	6.973986	0.143390	42.753280	0.023390	16
17	0.145644	6.866041	7.119630	0.140457	48.883674	0.020457	17
18	0.130040	7.689966	7.249670	0.137937	55.749715	0.017937	18
19	0.116107	8.612762	7.365777	0.135763	63.439681	0.015763	19
20	0.103667	9.646293	7.469444	0.133879	72.052442	0.013879	20
21	0.092560	10.803848	7.562003	0.132240	81.698736	0.012240	21
22	0.082643	12.100310	7.644646	0.130811	92.502584	0.010811	22
23	0.073788	13.552347	7.718434	0.129560	104.602894	0.009560	23
24	0.065882	15.178629	7.784316	0.128463	118.155241	0.008463	24
25	0.058823	17.000064	7.843139	0.127500	133.333870	0.007500	25
26	0.052521	19.040072	7.895660	0.126652	150.333934	0.006652	26
27	0.046894	21.324881	7.942554	0.125904	169.374007	0.005904	27
28	0.041869	23.883866	7.984423	0.125244	190.698887	0.005244	28
29	0.037383	26.749930	8.021806	0.124660	214.582754	0.004660	29
30	0.033378	29.959922	8.055184	0.124144	241.332684	0.004144	30
33	0.023758	42.091533	8.135352	0.122920	342.429446	0.002920	33
36	0.016910	59.135574	8.192414	0.12264	484.463116	0.002064	36
39	0.012036	83.081224	8.233030	0.121462	684.010197	0.001462	39
42	0.008567	116.723137	8.261939	0.121037	964.359478	0.001037	42
45	0.006098	163.987604	8.282516	0.120736	1358.230032	0.000736	45
48	0.004340	230.390776	8.297163	0.120523	1911.589803	0.000523	48
51	0.003089	323.682453	8.307588	0.120372	2689.020438	0.000372	51
54	0.002199	454.750541	8.315008	0.120264	3781.254506	0.000264	54
57	0.001565	638.891768	8.320290	0.120188	5315.764731	0.000188	57
60	0.001114	897.596933	8.324049	0.120134	7471.641112	0.000134	60
90	0.000037	26891.93422	8.333023	0.120004	224091.1185	0.000004	90
120	0.000001	805680.2550	8.333323	0.120000	6713993.792	0.000000	120

FACTORES

P/S: $1/(1+i)^n$ **R/P:** $[i(1+i)^n]/[(1+i)^n-1]$ **R/S:** $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ **P/R:** $[(1+i)^n - 1]/[i(1+i)^n]$ **S/R:** $[(1+i)^n-1]/i$

TABLA 15.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.869565	1.150000	0.869565	1.150000	1.000000	1.000000	1
2	0.756144	1.322500	1.625709	0.615116	2.150000	0.465116	2
3	0.657516	1.520875	2.283225	0.437977	3.472500	0.287977	3
4	0.571753	1.749006	2.854978	0.350265	4.993375	0.200265	4
5	0.497177	2.011357	3.352155	0.298316	6.742381	0.148316	5
6	0.432328	2.313061	3.784483	0.264237	8.753738	0.114237	6
7	0.375937	2.660020	4.160420	0.240360	11.066799	0.090360	7
8	0.326902	3.059023	4.487322	0.222850	13.726819	0.072850	8
9	0.284262	3.517876	4.771584	0.209574	16.785842	0.059574	9
10	0.247185	4.045558	5.018769	0.199252	20.303718	0.049252	10
11	0.214943	4.652391	5.233712	0.191069	24.349276	0.041069	11
12	0.186907	5.350250	5.420619	0.184481	29.001667	0.034481	12
13	0.162528	6.152788	5.583147	0.179110	34.351917	0.029110	13
14	0.141329	7.075706	5.724476	0.174688	40.504705	0.024688	14
15	0.122894	8.137062	5.847370	0.171017	47.580411	0.021017	15
16	0.106865	9.357621	5.954235	0.167948	55.717472	0.017948	16
17	0.092926	10.761264	6.047161	0.165367	65.075093	0.015367	17
18	0.080805	12.375454	6.127966	0.163186	75.836357	0.013186	18
19	0.070265	14.231772	6.198231	0.161336	88.211811	0.011336	19
20	0.061100	16.366537	6.259331	0.159761	102.443583	0.009761	20
21	0.053131	18.821518	6.312462	0.158417	118.810120	0.008417	21
22	0.046201	21.644746	6.358663	0.157266	137.631638	0.007266	22
23	0.040174	24.891458	6.398837	0.156278	159.276384	0.006278	23
24	0.034934	28.625176	6.433771	0.155430	184.167841	0.005430	24
25	0.030378	32.918953	6.464149	0.154699	212.793017	0.004699	25
26	0.026415	37.856796	6.490564	0.154070	245.711970	0.004070	26
27	0.022970	43.535315	6.513534	0.153526	283.568766	0.003526	27
28	0.019974	50.065612	6.533508	0.153057	327.104080	0.003057	28
29	0.017369	57.575454	6.550877	0.152651	377.169693	0.002651	29
30	0.015103	66.211772	6.565980	0.152300	434.745146	0.002300	30
33	0.009931	100.699829	6.600463	0.151505	664.665524	0.001505	33
36	0.006529	153.151852	6.623137	0.150986	1014.345680	0.000986	36
39	0.004293	232.924823	6.638045	0.150647	1546.165485	0.000647	39
42	0.002823	354.249540	6.647848	0.150425	2354.996933	0.000425	42
45	0.001856	538.769269	6.654293	0.150279	3585.128460	0.000279	45
48	0.001220	819.400712	6.658531	0.150183	5456.004746	0.000183	48
51	0.000802	1246.206058	6.661317	0.150120	8301.373719	0.000120	51
54	0.000528	1895.323638	6.663149	0.150079	12628.82425	0.000079	54
57	0.000347	2882.550338	6.664354	0.150052	19210.33559	0.000052	57
60	0.000228	4383.998746	6.665146	0.150034	29219.99164	0.000034	60

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 16.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.862069	1.160000	0.862069	1.160000	1.000000	1.000000	1
2	0.743163	1.345600	1.605232	0.622963	2.160000	0.462963	2
3	0.640658	1.560896	2.245890	0.445258	3.505600	0.285258	3
4	0.552291	1.810639	2.798181	0.357375	5.066496	0.197375	4
5	0.476113	2.100342	3.274294	0.305409	6.877135	0.145409	5
6	0.410442	2.436396	3.684736	0.271390	8.977477	0.111390	6
7	0.353830	2.826220	4.038565	0.247613	11.413873	0.087613	7
8	0.305025	3.278415	4.343591	0.230224	14.240093	0.070224	8
9	0.262953	3.802961	4.606544	0.217082	17.518508	0.057082	9
10	0.226684	4.411435	4.833227	0.206901	21.321469	0.046901	10
11	0.195417	5.117265	5.028644	0.198861	25.732904	0.038861	11
12	0.168463	5.936027	5.197107	0.192415	30.850169	0.032415	12
13	0.145227	6.885791	5.342334	0.187184	36.786196	0.027184	13
14	0.125195	7.987518	5.467529	0.182898	43.671987	0.022898	14
15	0.107927	9.265521	5.575456	0.179358	51.659505	0.019358	15
16	0.093041	10.748004	5.668497	0.176414	60.925026	0.016414	16
17	0.080207	12.467685	5.748704	0.173952	71.673030	0.013952	17
18	0.069144	14.462514	5.817848	0.171885	84.140715	0.011885	18
19	0.059607	16.776517	5.877455	0.170142	98.603230	0.010142	19
20	0.051385	19.460759	5.928841	0.168667	115.379747	0.008667	20
21	0.044298	22.574481	5.973139	0.167416	134.840506	0.007416	21
22	0.038188	26.186398	6.011326	0.166353	157.414987	0.006353	22
23	0.032920	30.376222	6.044247	0.165447	183.601385	0.005447	23
24	0.028380	35.236417	6.072627	0.164673	213.977607	0.004673	24
25	0.024465	40.874244	6.097092	0.164013	249.214024	0.004013	25
26	0.021091	47.414123	6.118183	0.163447	290.088267	0.003447	26
27	0.018182	55.000382	6.136364	0.162963	337.502390	0.002963	27
28	0.015674	63.800444	6.152038	0.162548	392.502773	0.002548	28
29	0.013512	74.008515	6.165550	0.162192	456.303216	0.002192	29
30	0.011648	85.849877	6.177198	0.161886	530.311731	0.001886	30
33	0.007463	134.002729	6.203359	0.161203	831.267059	0.001203	33
36	0.004781	209.164324	6.220119	0.160769	1301.027028	0.000769	36
39	0.003063	326.483757	6.230857	0.160492	2034.273483	0.000492	39
42	0.001962	509.607191	6.237736	0.160315	3178.794943	0.000315	42
45	0.001257	795.443826	6.242143	0.160201	4965.273911	0.000201	45
48	0.000805	1241.605086	6.244966	0.160129	7753.781787	0.000129	48
51	0.000516	1938.016412	6.246775	0.160083	12106.35258	0.000083	51
54	0.000331	3025.042066	6.247934	0.160053	18900.26291	0.000053	54
57	0.000212	4721.776060	6.248676	0.160034	29504.85038	0.000034	57
60	0.000136	7370.201365	6.249152	0.160022	46057.50853	0.000022	60

FACTORES

P/S: $1/(1+i)^n$ R/P:$[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 18.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.847458	1.180000	0.847458	1.180000	1.000000	1.000000	1
2	0.718184	1.392400	1.565642	0.638716	2.180000	0.458716	2
3	0.608631	1.643032	2.174273	0.459924	3.572400	0.279924	3
4	0.515789	1.938778	2.690062	0.371739	5.215432	0.191739	4
5	0.437109	2.287758	3.127171	0.319778	7.154210	0.139778	5
6	0.370432	2.699554	3.497603	0.285910	9.441968	0.105910	6
7	0.313925	3.185474	3.811528	0.262362	12.141522	0.082362	7
8	0.266038	3.758859	4.077566	0.245244	15.326996	0.065244	8
9	0.225456	4.435454	4.303022	0.232395	19.085855	0.052395	9
10	0.191064	5.233836	4.494086	0.222515	23.521309	0.042515	10
11	0.161919	6.175926	4.656005	0.214776	28.755144	0.034776	11
12	0.137220	7.287593	4.793225	0.208628	34.931070	0.028628	12
13	0.116288	8.599359	4.909513	0.203686	42.218663	0.023686	13
14	0.098549	10.147244	5.008062	0.199678	50.818022	0.019678	14
15	0.083516	11.973748	5.091578	0.196403	60.965266	0.016403	15
16	0.070776	14.129023	5.162354	0.193710	72.939014	0.013710	16
17	0.059980	16.672247	5.222334	0.191485	87.068036	0.011485	17
18	0.050830	19.673251	5.273164	0.189639	103.740283	0.009639	18
19	0.043077	23.214436	5.316241	0.188103	123.413534	0.008103	19
20	0.036506	27.393035	5.352746	0.186820	146.627970	0.006820	20
21	0.030937	32.323781	5.383683	0.185746	174.021005	0.005746	21
22	0.026218	38.142061	5.409901	0.184846	206.344785	0.004846	22
23	0.022218	45.007632	5.432120	0.184090	244.486847	0.004090	23
24	0.018829	53.109006	5.450949	0.183454	289.494479	0.003454	24
25	0.015957	62.668627	5.466906	0.182919	342.603486	0.002919	25
26	0.013523	73.948980	5.480429	0.182467	405.272113	0.002467	26
27	0.011460	87.259797	5.491889	0.182087	479.221093	0.002087	27
28	0.009712	102.966560	5.501601	0.181765	566.480890	0.001765	28
29	0.008230	121.500541	5.509831	0.181494	669.447450	0.001494	29
30	0.006975	143.370638	5.516806	0.181264	790.947991	0.001264	30
33	0.004245	235.562547	5.531971	0.180767	1303.125260	0.000767	33
36	0.002584	387.036802	5.541201	0.180466	2144.648902	0.000466	36
39	0.001573	635.913852	5.546819	0.180284	3527.299175	0.000284	39
42	0.000957	1044.826807	5.550238	0.180172	5799.037819	0.000172	42
45	0.000583	1716.683879	5.552319	0.180105	9531.577105	0.000105	45
48	0.000355	2820.566547	5.553586	0.180064	15664.25859	0.000064	48
51	0.000216	4634.281095	5.554357	0.180039	25740.45053	0.000039	51
54	0.000131	7614.272136	5.554826	0.180024	42295.95631	0.000024	54
57	0.000080	12510.49278	5.555111	0.180014	69497.18209	0.000014	57
60	0.000049	20555.13997	5.555285	0.180009	114189.6665	0.000009	60

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 20.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.833333	1.200000	0.833333	1.200000	1.000000	1.000000	1
2	0.694444	1.440000	1.527778	0.654545	2.200000	0.454545	2
3	0.578704	1.728000	2.106481	0.474725	3.640000	0.274725	3
4	0.482253	2.073600	2.588735	0.386289	5.368000	0.186289	4
5	0.401878	2.488320	2.990612	0.334380	7.441600	0.134380	5
6	0.334898	2.985984	3.325510	0.300706	9.929920	0.100706	6
7	0.279082	3.583181	3.604592	0.277424	12.915904	0.077424	7
8	0.232568	4.299817	3.837160	0.260609	16.499085	0.060609	8
9	0.193807	5.159780	4.030967	0.248079	20.798902	0.048079	9
10	0.161506	6.191736	4.192472	0.238523	25.958682	0.038523	10
11	0.134588	7.430084	4.327060	0.231104	32.150419	0.031104	11
12	0.112157	8.916100	4.439217	0.225265	39.580502	0.025265	12
13	0.093464	10.699321	4.532681	0.220620	48.496603	0.020620	13
14	0.077887	12.839185	4.610567	0.216893	59.195923	0.016893	14
15	0.064905	15.407022	4.675473	0.213882	72.035108	0.013882	15
16	0.054088	18.488426	4.729561	0.211436	87.442129	0.011436	16
17	0.045073	22.186111	4.774634	0.209440	105.930555	0.009440	17
18	0.037561	26.623333	4.812195	0.207805	128.116666	0.007805	18
19	0.031301	31.948000	4.843496	0.206462	154.740000	0.006462	19
20	0.026084	38.337600	4.869580	0.205357	186.688000	0.005357	20
21	0.021737	46.005120	4.891316	0.204444	225.025600	0.004444	21
22	0.018114	55.206144	4.909430	0.203690	271.030719	0.003690	22
23	0.015095	66.247373	4.924525	0.203065	326.236863	0.003065	23
24	0.012579	79.496847	4.937104	0.202548	392.484236	0.002548	24
25	0.010483	95.396217	4.947587	0.202119	471.981083	0.002119	25
26	0.008735	114.475460	4.956323	0.201762	567.377300	0.001762	26
27	0.007280	137.370552	4.963602	0.201467	681.852760	0.001467	27
28	0.006066	164.844662	4.969668	0.201221	819.223312	0.001221	28
29	0.005055	197.813595	4.974724	0.201016	984.067974	0.001016	29
30	0.004213	237.376314	4.978936	0.200846	1181.881569	0.000846	30
33	0.002438	410.186270	4.987810	0.200489	2045.931351	0.000489	33
36	0.001411	708.801875	4.99246	0.200283	3539.009375	0.000283	36
39	0.000816	1224.809640	4.995918	0.200163	6119.048200	0.000163	39
42	0.000472	2116.471058	4.997638	0.200095	10577.35529	0.000095	42
45	0.000273	3657.261988	4.998633	0.200055	18281.30994	0.000055	45
48	0.000158	6319.748715	4.999209	0.200032	31593.74358	0.000032	48
51	0.000092	10920.52578	4.999542	0.200018	54597.62890	0.000018	51
54	0.000053	18870.66855	4.999735	0.200011	94348.34274	0.000011	54
57	0.000031	32608.51525	4.999847	0.200006	163037.5763	0.000006	57
60	0.000018	56347.51435	4.999911	0.200004	281732.5718	0.000004	60

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 21.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.826446	1.210000	0.826446	1.210000	1.000000	1.000000	1
2	0.683013	1.464100	1.509460	0.662489	2.210000	0.452489	2
3	0.564474	1.771561	2.073934	0.482175	3.674100	0.272175	3
4	0.466507	2.143589	2.540441	0.393632	5.445661	0.183632	4
5	0.385543	2.593742	2.925984	0.341765	7.589250	0.131765	5
6	0.318631	3.138428	3.244615	0.308203	10.182992	0.098203	6
7	0.263331	3.797498	3.507946	0.285067	13.321421	0.075067	7
8	0.217629	4.594973	3.725576	0.268415	17.118919	0.058415	8
9	0.179859	5.559917	3.905434	0.256053	21.713892	0.046053	9
10	0.148644	6.727500	4.054078	0.246665	27.273809	0.036665	10
11	0.122846	8.140275	4.176924	0.239411	34.001309	0.029411	11
12	0.101526	9.849733	4.278450	0.233730	42.141584	0.023730	12
13	0.083905	11.918177	4.362355	0.229234	51.991317	0.019234	13
14	0.069343	14.420994	4.431698	0.225647	63.909493	0.015647	14
15	0.057309	17.449402	4.489007	0.222766	78.330487	0.012766	15
16	0.047362	21.113777	4.536369	0.220441	95.779889	0.010441	16
17	0.039143	25.547670	4.575512	0.218555	116.893666	0.008555	17
18	0.032349	30.912681	4.607861	0.217020	142.441336	0.007020	18
19	0.026735	37.404343	4.634596	0.215769	173.354016	0.005769	19
20	0.022095	45.259256	4.656691	0.214745	210.758360	0.004745	20
21	0.018260	54.763699	4.674951	0.213906	256.017615	0.003906	21
22	0.015091	66.264076	4.690042	0.213218	310.781315	0.003218	22
23	0.012472	80.179532	4.702514	0.212652	377.045391	0.002652	23
24	0.010307	97.017234	4.712822	0.212187	457.224923	0.002187	24
25	0.008519	117.390853	4.721340	0.211804	554.242157	0.001804	25
26	0.007040	142.042932	4.728380	0.211489	671.633009	0.001489	26
27	0.005818	171.871948	4.734199	0.211229	813.675941	0.001229	27
28	0.004809	207.965057	4.739007	0.211015	985.547889	0.001015	28
29	0.003974	251.637719	4.742981	0.210838	1193.512946	0.000838	29
30	0.003284	304.481640	4.746265	0.210692	1445.150664	0.000692	30
33	0.001854	539.407798	4.753077	0.210390	2563.846656	0.000390	33
36	0.001046	955.593818	4756922	0.210220	4545.684846	0.000220	36
39	0.000591	1692.892739	4.759092	0.210124	8056.632092	0.000124	39
42	0.000333	2999.062754	4.760317	0.210070	14276.48931	0.000070	42
45	0.000188	5313.022612	4.761008	0.210040	25295.34577	0.000040	45
48	0.000106	9412.343651	4.761399	0.210022	44815.92215	0.000022	48
51	0.000060	16674.54093	4.761619	0.210013	79397.81396	0.000013	51
54	0.000034	29539.96641	4.761744	0.210007	140661.7448	0.000007	54
57	0.000019	52331.85243	4.761814	0.210004	249194.5354	0.000004	57
60	0.000011	92709.06882	4.761853	0.210002	441466.9944	0.000002	60

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 24.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.806452	1.240000	0.806452	1.240000	1.000000	1.000000	1
2	0.650364	1.537600	1.456816	0.686429	2.240000	0.446429	2
3	0.524487	1.906624	1.981303	0.504718	3.777600	0.264718	3
4	0.422974	2.364214	2.404277	0.415926	5.684224	0.175926	4
5	0.341108	2.931625	2.745384	0.364248	8.048438	0.124248	5
6	0.275087	3.635215	3.020471	0.331074	10.980063	0.091074	6
7	0.221844	4.507667	3.242316	0.308422	14.615278	0.068422	7
8	0.178907	5.589507	3.421222	0.292293	19.122945	0.052293	8
9	0.144280	6.930988	3.565502	0.280465	24.712451	0.040465	9
10	0.116354	8.594426	3.681856	0.271602	31.643440	0.031602	10
11	0.093834	10.657088	3.775691	0.264852	40.237865	0.024852	11
12	0.075673	13.214789	3.851363	0.259648	50.894953	0.019648	12
13	0.061026	16.386338	3.912390	0.255598	64.109741	0.015598	13
14	0.049215	20.319059	3.961605	0.252423	80.496079	0.012423	14
15	0.039689	25.195633	4.001294	0.249919	100.815138	0.009919	15
16	0.032008	31.242585	4.033302	0.247936	126.010772	0.007936	16
17	0.025813	38.740806	4.059114	0.246359	157.253357	0.006359	17
18	0.020817	48.038599	4.079931	0.245102	195.994162	0.005102	18
19	0.016788	59.567863	4.096718	0.244098	244.032761	0.004098	19
20	0.013538	73.864150	4.110257	0.243294	303.600624	0.003294	20
21	0.010918	91.591546	4.121175	0.242649	377.464774	0.002649	21
22	0.008805	113.573517	4.129980	0.242132	469.056320	0.002132	22
23	0.007101	140.831161	4.137080	0.241716	582.629836	0.001716	23
24	0.005726	174.630639	4.142807	0.241382	723.460997	0.001382	24
25	0.004618	216.541993	4.147425	0.241113	898.091636	0.001113	25
26	0.003724	268.512071	4.151149	0.240897	1114.633629	0.000897	26
27	0.003003	332.954968	4.154152	0.240723	1383.145700	0.000723	27
28	0.002422	412.864160	4.156575	0.240583	1716.100668	0.000583	28
29	0.001953	511.951559	4.158528	0.240470	2128.964828	0.000470	29
30	0.001575	634.819933	4.160103	0.240379	2640.916387	0.000379	30
33	0.000826	1210.362920	4.163224	0.240198	5039.012166	0.000198	33
36	0.000433	2307.70699	4.164861	0.240104	9611.279132	0.000104	36
39	0.000227	4399.929535	4.165720	0.240055	18328.87306	0.000055	39
42	0.000119	8389.011250	4.166170	0.240029	34950.04688	0.000029	42
45	0.000063	15994.69019	4.166406	0.240015	66640.37577	0.000015	45
48	0.000033	30495.86018	4.166530	0.240008	127061.9174	0.000008	48
51	0.000017	58144.13892	4.166595	0.240004	242263.0788	0.000004	51
54	0.000009	110859.0107	4.166629	0.240002	461908.3780	0.000002	54
57	0.000005	211366.4505	4.166647	0.240001	880689.3770	0.000001	57
60	0.000002	402996.3473	4.166656	0.240001	1679147.280	0.000001	60

FACTORES

P/S: $1/(1+i)^n$ R/P:$[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 28.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.781250	1.280000	0.781250	1.280000	1.000000	1.000000	1
2	0.610352	1.638400	1.391602	0.718596	2.280000	0.438596	2
3	0.476837	2.097152	1.868439	0.535206	3.918400	0.255206	3
4	0.372529	2.684355	2.240968	0.446236	6.015552	0.166236	4
5	0.291038	3.435974	2.532006	0.394944	8.699907	0.114944	5
6	0.227374	4.398047	2.759380	0.362400	12.135880	0.082400	6
7	0.177636	5.629500	2.937015	0.340482	16.533927	0.060482	7
8	0.138778	7.205759	3.075793	0.325119	22.163426	0.045119	8
9	0.108420	9.223372	3.184214	0.314049	29.369186	0.034049	9
10	0.084703	11.805916	3.268917	0.305912	38.592558	0.025912	10
11	0.066174	15.111573	3.335091	0.299842	50.398474	0.019842	11
12	0.051699	19.342813	3.386790	0.295265	65.510047	0.015265	12
13	0.040390	24.758801	3.427180	0.291785	84.852860	0.011785	13
14	0.031554	31.691265	3.458734	0.289123	109.611661	0.009123	14
15	0.024652	40.564819	3.483386	0.287077	141.302926	0.007077	15
16	0.019259	51.922969	3.502645	0.285499	181.867745	0.005499	16
17	0.015046	66.461400	3.517692	0.284277	233.790714	0.004277	17
18	0.011755	85.070592	3.529447	0.283331	300.252113	0.003331	18
19	0.009184	108.890357	3.538630	0.282595	385.322705	0.002595	19
20	0.007175	139.379657	3.545805	0.282023	494.213062	0.002023	20
21	0.005605	178.405962	3.551410	0.281578	633.592720	0.001578	21
22	0.004379	228.359631	3.555789	0.281232	811.998682	0.001232	22
23	0.003421	292.300327	3.559210	0.280961	1040.358312	0.000961	23
24	0.002673	374.144419	3.561883	0.280750	1332.658640	0.000750	24
25	0.002088	478.904857	3.563971	0.280586	1706.803059	0.000586	25
26	0.001631	612.998216	3.565602	0.280458	2185.707916	0.000458	26
27	0.001274	784.637717	3.566877	0.280357	2798.706132	0.000357	27
28	0.000996	1004.336278	3.567873	0.280279	3583.343849	0.000279	28
29	0.000778	1285.550435	3.568650	0.280218	4587.680126	0.000218	29
30	0.000608	1645.504557	3.569258	0.280170	5873.230562	0.000170	30
33	0.000290	3450.873173	3.570394	0.280081	12320.97562	0.000081	33
36	0.000138	727.005577	3.570935	0.280039	25842.87706	0.000039	36
39	0.000066	15177.10072	3.571193	0.280018	54200.35972	0.000018	39
42	0.000031	31828.68713	3.571316	0.280009	113670.3112	0.000009	42
45	0.000015	66749.59487	3.571375	0.280004	238387.8388	0.000004	45
48	0.000007	139984.0464	3.571403	0.280002	499939.4514	0.000002	48
51	0.000003	293567.8228	3.571416	0.280001	1048452.939	0.000001	51
54	0.000002	615656.3468	3.571423	0.280000	2198769.096	0.000000	54
57	0.000001	1291124.939	3.571426	0.280000	4611156.925	0.000000	57
60	0.000000	2707685.248	3.571427	0.280000	9670300.886	0.000000	60

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 30.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.769231	1.300000	0.769231	1.300000	1.000000	1.000000	1
2	0.591716	1.690000	1.360947	0.734783	2.300000	0.434783	2
3	0.455166	2.197000	1.816113	0.550627	3.990000	0.250627	3
4	0.350128	2.856100	2.166241	0.461629	6.187000	0.161629	4
5	0.269329	3.712930	2.435570	0.410582	9.043100	0.110582	5
6	0.207176	4.826809	2.642746	0.378394	12.756030	0.078394	6
7	0.159366	6.274852	2.802112	0.356874	17.582839	0.056874	7
8	0.122589	8.157307	2.924702	0.341915	23.857691	0.041915	8
9	0.094300	10.604499	3.019001	0.331235	32.014998	0.031235	9
10	0.072538	13.785849	3.091539	0.323463	42.619497	0.023463	10
11	0.055799	17.921604	3.147338	0.317729	56.405346	0.017729	11
12	0.042922	23.298085	3.190260	0.313454	74.326950	0.013454	12
13	0.033017	30.287511	3.223277	0.310243	97.625036	0.010243	13
14	0.025398	39.373764	3.248675	0.307818	127.912546	0.007818	14
15	0.019537	51.185893	3.268211	0.305978	167.286310	0.005978	15
16	0.015028	66.541661	3.283239	0.304577	218.472203	0.004577	16
17	0.011560	86.504159	3.294800	0.303509	285.013864	0.003509	17
18	0.008892	112.455407	3.303692	0.302692	371.518023	0.002692	18
19	0.006840	146.192029	3.310532	0.302066	483.973430	0.002066	19
20	0.005262	190.049638	3.315794	0.301587	630.165459	0.001587	20
21	0.004048	247.064529	3.319842	0.301219	820.215097	0.001219	21
22	0.003113	321.183888	3.322955	0.300937	1067.279626	0.000937	22
23	0.002395	417.539054	3.325350	0.300720	1388.463514	0.000720	23
24	0.001842	542.800770	3.327192	0.300554	1806.002568	0.000554	24
25	0.001417	705.641001	3.328609	0.300426	2348.803338	0.000426	25
26	0.001090	917.333302	3.329700	0.300327	3054.444340	0.000327	26
27	0.000839	1192.533293	3.330538	0.300252	3971.777642	0.000252	27
28	0.000645	1550.293280	3.331183	0.300194	5164.310934	0.000194	28
29	0.000496	2015.381264	3.331679	0.300149	6714.604214	0.000149	29
30	0.000382	2619.995644	3.332061	0.300115	8729.985479	0.000115	30

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 32.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.757576	1.320000	0.757576	1.320000	1.000000	1.000000	1
2	0.573921	1.742400	1.331497	0.751034	2.320000	0.431034	2
3	0.434789	2.299968	1.766285	0.566160	4.062400	0.246160	3
4	0.329385	3.035958	2.095671	0.477174	6.362368	0.157174	4
5	0.249534	4.007464	2.345205	0.426402	9.398326	0.106402	5
6	0.189041	5.289853	2.534246	0.394595	13.405790	0.074595	6
7	0.143213	6.982606	2.677459	0.373488	18.695643	0.053488	7
8	0.108495	9.217040	2.785954	0.358943	25.678249	0.038943	8
9	0.082193	12.166492	2.868147	0.348657	34.895288	0.028657	9
10	0.062267	16.059770	2.930414	0.341249	47.061780	0.021249	10
11	0.047172	21.198896	2.977587	0.335842	63.121550	0.015842	11
12	0.035737	27.982543	3.013323	0.331860	84.320446	0.011860	12
13	0.027073	36.936956	3.040396	0.328904	112.302988	0.008904	13
14	0.020510	48.756782	3.060906	0.326701	149.239945	0.006701	14
15	0.015538	64.358953	3.076444	0.325051	197.996727	0.005051	15
16	0.011771	84.953818	3.088215	0.323812	262.355680	0.003812	16
17	0.008918	112.139039	3.097133	0.322879	347.309497	0.002879	17
18	0.006756	148.023532	3.103888	0.322177	459.448536	0.002177	18
19	0.005118	195.391062	3.109006	0.321646	607.472068	0.001646	19
20	0.003877	257.916202	3.112884	0.321246	802.863130	0.001246	20
21	0.002937	340.449386	3.115821	0.320943	1060.779331	0.000943	21
22	0.002225	449.393190	3.118046	0.320714	1401.228717	0.000714	22
23	0.001686	593.199010	3.119732	0.320540	1850.621907	0.000540	23
24	0.001277	783.022694	3.121009	0.320409	2443.820917	0.000409	24
25	0.000968	1033.589955	3.121977	0.320310	3226.843611	0.000310	25
26	0.000733	1364.338741	3.122710	0.320235	4260.433566	0.000235	26
27	0.000555	1800.927138	3.123265	0.320178	5624.772307	0.000178	27
28	0.000421	2377.223823	3.123685	0.320135	7425.699446	0.000135	28
29	0.000319	3137.935446	3.124004	0.320102	9802.923268	0.000102	29
30	0.000241	4142.074789	3.124246	0.320077	12940.85871	0.000077	30

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 36.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.735294	1.360000	0.735294	1.360000	1.000000	1.000000	1
2	0.540657	1.849600	1.275952	0.783729	2.360000	0.423729	2
3	0.397542	2.515456	1.673494	0.597552	4.209600	0.237552	3
4	0.292310	3.421020	1.965804	0.508698	6.725056	0.148698	4
5	0.214934	4.652587	2.180738	0.458560	10.146076	0.098560	5
6	0.158040	6.327519	2.338778	0.427574	14.798664	0.067574	6
7	0.116206	8.605426	2.454984	0.407335	21.126182	0.047335	7
8	0.085445	11.703379	2.540429	0.393634	29.731608	0.033634	8
9	0.062828	15.916595	2.603257	0.384134	41.434987	0.024134	9
10	0.046197	21.646570	2.649454	0.377436	57.351582	0.017436	10
11	0.033968	29.439335	2.683422	0.372659	78.998152	0.012659	11
12	0.024977	40.037495	2.708398	0.369222	108.437487	0.009222	12
13	0.018365	54.450994	2.726764	0.366735	148.474982	0.006735	13
14	0.013504	74.053351	2.740267	0.364928	202.925976	0.004928	14
15	0.009929	100.712558	2.750197	0.363610	276.979327	0.003610	15
16	0.007301	136.969078	2.757497	0.362648	377.691885	0.002648	16
17	0.005368	186.277947	2.762866	0.361943	514.660963	0.001943	17
18	0.003947	253.338008	2.766813	0.361427	700.938910	0.001427	18
19	0.002902	344.539690	2.769715	0.361048	954.276918	0.001048	19
20	0.002134	468.573979	2.771850	0.360770	1298.816608	0.000770	20
21	0.001569	637.260611	2.773419	0.360566	1767.390587	0.000566	21
22	0.001154	866.674431	2.774573	0.360416	2404.651198	0.000416	22
23	0.000848	1178.677227	2.775421	0.360306	3271.325629	0.000306	23
24	0.000624	1603.001028	2.776045	0.360225	4450.002856	0.000225	24
25	0.000459	2180.081398	2.776504	0.360165	6053.003884	0.000165	25
26	0.000337	2964.910702	2.776841	0.360121	8233.085282	0.000121	26
27	0.000248	4032.278554	2.777089	0.360089	11197.99598	0.000089	27
28	0.000182	5483.898834	2.777271	0.360066	15230.27454	0.000066	28
29	0.000134	7458.102414	2.777405	0.360048	20714.17337	0.000048	29
30	0.000099	10143.01928	2.777504	0.360035	28172.27578	0.000035	30

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 40.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.714286	1.400000	0.714286	1.400000	1.000000	1.000000	1
2	0.510204	1.960000	1.224490	0.816667	2.400000	0.416667	2
3	0.364431	2.744000	1.588921	0.629358	4.360000	0.229358	3
4	0.260308	3.841600	1.849229	0.540766	7.104000	0.140766	4
5	0.185934	5.378240	2.035164	0.491361	10.945600	0.091361	5
6	0.132810	7.529536	2.167974	0.461260	16.323840	0.061260	6
7	0.094865	10.541350	2.262839	0.441923	23.853376	0.041923	7
8	0.067760	14.757891	2.330599	0.429074	34.394726	0.029074	8
9	0.048400	20.661047	2.378999	0.420345	49.152617	0.020345	9
10	0.034572	28.925465	2.413571	0.414324	69.813664	0.014324	10
11	0.024694	40.495652	2.438265	0.410128	98.739129	0.010128	11
12	0.017639	56.693912	2.455904	0.407182	139.234781	0.007182	12
13	0.012599	79.371477	2.468503	0.405104	195.928693	0.005104	13
14	0.008999	111.120068	2.477502	0.403632	275.300171	0.003632	14
15	0.006428	155.568096	2.483930	0.402588	386.420239	0.002588	15
16	0.004591	217.795334	2.488521	0.401845	541.988334	0.001845	16
17	0.003280	304.913467	2.491801	0.401316	759.783668	0.001316	17
18	0.002343	426.878854	2.494144	0.400939	1064.697136	0.000939	18
19	0.001673	597.630396	2.495817	0.400670	1491.575990	0.000670	19
20	0.001195	836.682554	2.497012	0.400479	2089.206386	0.000479	20
21	0.000854	1171.355576	2.497866	0.400342	2925.888940	0.000342	21
22	0.000610	1639.897806	2.498476	0.400244	4097.244516	0.000244	22
23	0.000436	2295.856929	2.498911	0.400174	5737.142322	0.000174	23
24	0.000311	3214.199700	2.499222	0.400124	8032.999251	0.000124	24
25	0.000222	4499.879581	2.499444	0.400089	11247.19895	0.000089	25
26	0.000159	6299.831413	2.499603	0.400064	15747.07853	0.000064	26
27	0.000113	8819.763978	2.499717	0.400045	22046.90994	0.000045	27
28	0.000081	12347.66957	2.499798	0.400032	30866.67392	0.000032	28
29	0.000058	17286.73740	2.499855	0.400023	43214.34349	0.000023	29
30	0.000041	24201.43236	2.499897	0.400017	60501.08089	0.000017	30

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 44.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.694444	1.440000	0.694444	1.440000	1.000000	1.000000	1
2	0.482253	2.073600	1.176698	0.849836	2.440000	0.409836	2
3	0.334898	2.985984	1.511596	0.661553	4.513600	0.221553	3
4	0.232568	4.299817	1.744164	0.573341	7.499584	0.133341	4
5	0.161506	6.191736	1.905669	0.524750	11.799401	0.084750	5
6	0.112157	8.916100	2.017826	0.495583	17.991137	0.055583	6
7	0.077887	12.839185	2.095712	0.477165	26.907238	0.037165	7
8	0.054088	18.488426	2.149800	0.465159	39.746422	0.025159	8
9	0.037561	26.623333	2.187361	0.457172	58.234848	0.017172	9
10	0.026084	38.337600	2.213445	0.451784	84.858182	0.011784	10
11	0.018114	55.206144	2.231559	0.448117	123.195782	0.008117	11
12	0.012579	79.496847	2.244138	0.445605	178.401925	0.005605	12
13	0.008735	114.475460	2.252874	0.443877	257.898773	0.003877	13
14	0.006066	164.844662	2.258940	0.442685	372.374233	0.002685	14
15	0.004213	237.376314	2.263153	0.441861	537.218895	0.001861	15
16	0.002926	341.821892	2.266078	0.441291	774.595209	0.001291	16
17	0.002032	492.223524	2.268110	0.440896	1116.417101	0.000896	17
18	0.001411	708.801875	2.269521	0.440622	1608.640625	0.000622	18
19	0.000980	1020.674700	2.270501	0.440432	2317.442500	0.000432	19
20	0.000680	1469.771568	2.271181	0.440300	3338.117200	0.000300	20
21	0.000472	2116.471058	2.271653	0.440208	4807.888768	0.000208	21
22	0.000328	3047.718323	2.271982	0.440144	6924.359826	0.000144	22
23	0.000228	4388.714386	2.272209	0.440100	9972.078149	0.000100	23
24	0.000158	6319.748715	2.272368	0.440070	14360.79253	0.000070	24
25	0.000110	9100.438150	2.272478	0.440048	20680.54125	0.000048	25
26	0.000076	13104.63094	2.272554	0.440034	29780.97940	0.000034	26
27	0.000053	18870.66855	2.272607	0.440023	42885.61034	0.000023	27
28	0.000037	27173.76271	2.272644	0.440016	61756.27888	0.000016	28
29	0.000026	39130.21830	2.272669	0.440011	88930.04159	0.000011	29
30	0.000018	56347.51435	2.272687	0.440008	128060.2599	0.000008	30

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

TABLA 48.0%

FACTORES DE EQUIVALENCIA FINANCIERA

N	P/S	S/P	P/R	R/P	S/R	R/S	N
1	0.675676	1.480000	0.675676	1.480000	1.000000	1.000000	1
2	0.456538	2.190400	1.132213	0.883226	2.480000	0.403226	2
3	0.308471	3.241792	1.440685	0.694114	4.670400	0.214114	3
4	0.208427	4.797852	1.649111	0.606387	7.912192	0.126387	4
5	0.140829	7.100821	1.789940	0.558678	12.710044	0.078678	5
6	0.095155	10.509215	1.885095	0.530477	19.810865	0.050477	6
7	0.064294	15.553639	1.949388	0.512981	30.320081	0.032981	7
8	0.043442	23.019385	1.992830	0.501799	45.873719	0.021799	8
9	0.029352	34.068690	2.022182	0.494515	68.893105	0.014515	9
10	0.019833	50.421662	2.042015	0.489712	102.961795	0.009712	10
11	0.013401	74.624059	2.055416	0.486520	153.383457	0.006520	11
12	0.009054	110.443608	2.064470	0.484386	228.007516	0.004386	12
13	0.006118	163.456539	2.070588	0.482955	338.451124	0.002955	13
14	0.004134	241.915678	2.074722	0.481992	501.907663	0.001992	14
15	0.002793	358.035204	2.077515	0.481344	743.823342	0.001344	15
16	0.001887	529.892102	2.079402	0.480908	1101.858546	0.000908	16
17	0.001275	784.240311	2.080677	0.480613	1631.750647	0.000613	17
18	0.000862	1160.675660	2.081538	0.480414	2415.990958	0.000414	18
19	0.000582	1717.799977	2.082121	0.480280	3576.666618	0.000280	19
20	0.000393	2542.343965	2.082514	0.480189	5294.466595	0.000189	20
21	0.000266	3762.669069	2.082780	0.480128	7836.810560	0.000128	21
22	0.000180	5568.750222	2.082959	0.480086	11599.47963	0.000086	22
23	0.000121	8241.750328	2.083081	0.480058	17168.22985	0.000058	23
24	0.000082	12197.79049	2.083163	0.480039	25409.98018	0.000039	24
25	0.000055	18052.72992	2.083218	0.480027	37607.77067	0.000027	25
26	0.000037	26718.04028	2.083255	0.480018	55660.50059	0.000018	26
27	0.000025	39542.69962	2.083281	0.480012	82378.54087	0.000012	27
28	0.000017	58523.19543	2.083298	0.480008	121921.2405	0.000008	28
29	0.000012	86614.32924	2.083309	0.480006	180444.4359	0.000006	29
30	0.000008	128189.2073	2.083317	0.480004	267058.7652	0.000004	30

FACTORES

P/S: $1/(1+i)^n$ R/P: $[i(1+i)^n]/[(1+i)^n-1]$ R/S: $[i]/[(1+i)^n-1]$

S/P: $(1+i)^n$ P/R: $[(1+i)^n - 1]/[i(1+i)^n]$ S/R: $[(1+i)^n-1]/i$

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