A Manager's Guide
to
Trade Finance Discounting

# INTRODUCTION

This monograph provides background on discounted trade finance transactions and uses simple examples to illustrate some of the issues, factors, calculations, and terminology.  It is intended for managers and analysts who would like to know more about an international financing technique.


## What Trade Paper Is


In a conventional trade finance transaction, any of several financial instruments (trade paper)  promising payment at a future date are exchanged for goods or services at time of shipment.   More generally, these instruments can be used to fund activities earlier in the supply chain (pre-export) such as purchase of material or commodities, harvesting, or processing.  Institutions with funds available for allocation to the risks and benefits profile of trade finance but without the expertise or presence can also provide wholesale loans to institutions that specialize in serving local entities.

For convenience, we refer to the range of instruments as 'notes' since the discounting process and calculations are similar to promissory notes.  Trade paper shares a characteristic with registered securities such as stocks and bonds in that it is negotiable.  When endorsed as "without recourse" an instrument can be sold by the originator in the secondary market, where it can be freely traded.  Under normal circumstances the holder of such a 'forfaited' note can seek payment only from the issuer, not previous holders.  Notes are usually denominated in hard currencies leaving local currency risk with the borrower.

There is a belief that a note which funds the purchase of goods or capital equipment is self-liquidating, verifiable, and economic, and is therefore more desirable other debt instruments.


## What Trade Paper Isn't


Trade paper is different from stocks, bonds, commodities, or currency in that its value does not depend primarily on diverse perceptions of possibly unenlightened investors.  Its value is based on single, real transactions between known entities.  It is less volatile and less subject to speculation than for instruments that depend on general revenue or corporate fixed assets.  It has a short-or medium-term maturity date, at which time there is a defined value, further providing stability.

Because there are few parties involved in each transaction, and because a wide variety of goods and services can be financed for many different reasons, there can be considerable variation in deal terms.  Therefore it is helpful to understand the principles and methods used.

## Rationale for This Document

Questions are often asked about the amount of discount interest as calculated by banks, forfaiters, or discounters for a note or set of notes. Attempts to verify a proposed discount by using tables, calculators, or spreadsheets often yield different results because:

- Discounters typically take into account the number of days in a compound interest period, rather than using fixed period lengths that are fractions of a year—one-half for example.

- The Market Standard Forfaiting (MTC) convention used by discounters uses a seemingly arbitrary number of days in a compounding period, and

- Different mathematical models may be used.

In addition, there are many other factors or which, in combination, create tens of thousands of alternative possibilities, resulting in differences as small as a few cents to several percent. In general, the other calculation tools do not take these factors into account, and so yield different discounts. .

## Background – The Swiss in the Middle

Financing of international goods flows with notes where there is no recourse to previous note holders of those receivables, is called forfaiting. The term derives from the French "a forfait" indicating that a holder in due course, or forfaiter, forfeits his claims against previous holders. The technique, also called "non-recourse discount finance", is a subset of "structured finance".

From ancient roots, forfaiting  was developed by the Swiss after World War II to finance the sale of equipment from Germany to Eastern Europe.  The technique facilitated the sale of badly needed equipment to areas of high demand where the inherently high equipment margins could cover the currency, political, and credit risks.  The Swiss bankers funded the debt freeing the manufacturers' to accept more business.

Today, forfaiting  provides short to medium-term funds covering a wide range of goods or services from time of shipment until the importer (buyer) can turn the goods into cash to repay the debt.   The period can be short, measured in days, or can extend for several years, depending on the underlying transaction, countries involved, the players, and markets.  Where the credit rating of the borrower is unknown or inadequate, his bank may provide a guarantee or 'aval'

Notes may be discounted or interest-bearing in which case they can look like conventional bank inventory finance loans.  But their roots in trade finance lead

to some distinctions.

## Negotiable Instruments Sound Better

Although used in many different situations, trade finance instruments conventionally deal with three underlying facts:

- An importer wants to finance a purchase over time.

- Importers and exporters probably do not have established credit lines between themselves or even know each other particularly well.

- Financial organizations in the importer's country may understand the local economy, industry, and importer but have limited funds in the desired currency or at the desired interest rate, while financial organizations in Europe or North America may have the funds to lend but limited knowledge of the importer's economic and political environment.

An 'importer' may actually be a goods buyer or borrower; an 'exporter' may refer to a supplier or other source of goods.

Trade finance instruments replace conventional lending in which a single financial institution both understands the credit involved and has the funds. (Loan syndications also break the requirement that a single institution have the requisite full range of skills.)

Of course, the technique is not necessarily limited to international transactions, but it is most often discussed in those terms because of its genesis and most common application.

The available instruments are: fixed or floating rate promissory notes, bills of exchange (drafts), and acceptances, the common forms of which are described in a following paragraphs. Although many aspects of structuring and evaluating them are similar, there are laws, conventions, and practices that differ from instrument to instrument and place to place that are beyond the scope of this monograph.

### Promissory Notes

One or more promissory notes, or promises to pay, are issued by the importer directly to the exporter, usually with a guarantee or "aval" from his bank. The aval by a financial institution replaces the credit of the importer with that of the

institution.  While the importer must pay for the guarantee, the cost may be offset by a lower rate on the note itself, which becomes readily negotiable when endorsed as "without recourse".

## Bills of Exchange

A draft, or bill of exchange, is a demand for payment normally drawn by the exporter  and accepted by the importer.  It is similar to an invoice in that it is issued by the exporter, but once it is "accepted" (endorsed, acknowledged) by the importer, it becomes a trade acceptance, which may be negotiable or not negotiable. The importers bank may add its aval (endorsement guaranteeing payment)  or issue a separate letter of guarantee.

Bills of exchange can also be issued as a requirement of a letter of credit.

## Acceptances

Trade acceptances have a similar effect as a promissory note but work the other way around. An exporter, rather than an importer, issues an invoice to the importer giving the exporter the right to draft the account of the importer upon, say, shipment of goods.  The invoice becomes effective when the importer accepts it.  The acceptance can then be discounted, as with a promissory note, for immediate payment to the exporter or held to maturity by the exporter.

A bankers acceptance is a time draft drawn on and accepted by a bank. The importer orders its bank to pay a specified amount of money at maturity to the holder of the draft. Once the bank "accepts" the draft, the bank has the unconditional liability for payment of the draft. The bank discounts the draft at an amount less than the face amount, which includes interest, providing cash for the importer to pay the exporter. At maturity, the importer pays the face value to the holder of the acceptance.

The bank may hold the acceptance to maturity or sell it for a rediscount in the secondary market to a short term investor. In the former case, the bank is making a loan to the importer. In the latter case, the bank is substituting its credit for that of the importer, allowing the importer to borrow in the money markets.

An alternative form of acceptance financing is often generated in connection with a letter of credit (LC or more properly "Documentary Credit") by an importer's bank, based on its knowledge of the importer's credit.  The LC promises to pay an exporter upon proof of shipment and related conditions. A second bank in the exporter's country notifies (advises) the exporter, and may add its own guarantee (confirmation), and may, depending on its arrangement with the issuing bank, pay the exporter directly according to the instructions in the LC.

A condition of the LC can be a documentary draft, sometimes called a Bill of Exchange, where the drawer of the draft is the exporter and it is presented to the bank at the time the other conditions are met. The exporter, as the drawer, has a secondary liability if the bank is unable to pay.

The exporter may want acceptance financing if it needs cash after providing credit to an importer. The procedures and options are similar for exporter and importer acceptance financing.

## Traditional Loans

Loans backed by a borrowers general credit can, of course, be used to finance a trade transaction. But in that case, rates and other terms are determined by the general credit of the borrower, and so are not considered trade paper.

## Non-Recourse

To qualify as negotiable instruments, notes must be endorsed by a note seller as non-recourse. The buyer then can only look to the note borrower (or guarantor) for ultimate repayment, not a prior note holder, with two exceptions. In the case of fraud, a previous note holder can be held responsible, and in the case of drafts issued by a exporter, a note holder may have recourse to the importer.

But the importer is obligated to pay the notes or drafts regardless of the success or failure of the underlying commercial transaction. As a consequence, the importer looses some practical control that he might have otherwise had over the exporter if the goods had been financed on account.

# Primary Players

There are usually four participants involved in putting together the commercial transaction and its financing.

## Supplier

A supplier (shipper, exporter, manufacturer, or professional organization) produces goods or services for sale, conventionally capital equipment with significant economic value.

## Borrowers

A borrower (importer, buyer) acquires the goods or services but wishes to pay for them over a period during which their economic value is realized.  At time of shipment it "pays" for the goods by giving the supplier notes in exchange for the goods.  Because the notes are payable at a future date, their face value will be greater than the standard, list price of the goods.


## Guarantors

With the exception of some large international organizations, the creditworthiness of the borrower is not broadly known so that its notes would not be generally accepted.  Potential note buyers do recognize, however, the strength of trade-oriented banks and other financial organizations, partly because they are regulated institutions.  Their guarantee on notes vastly expands the universe of potential note buyers and is therefore a practical requirement for negotiability.

The guarantor can evaluate the creditworthiness of a borrower, often an unknown to the suppliers or discounters.  The borrower's bank may guarantee the borrower's notes by countersigning them on their face in a "Per Aval" area, or by issuing a separate written guarantee, or by issuing a standby letter of credit.  Particularly in emerging markets, banks can earn fee income using their expertise rather than capital.

## Discounters

An originating or primary discounter (or his agent) works with the trading partners to structure a set of notes to fit the marketing needs of the exporter and project cash flow of the importer.  He is expert in evaluating the credit of banks providing guarantees and the regulations of the importing country.  His business development staff may specialize in geographic areas, types of trade, or transaction size.

The primary discounter may hold some of the notes originated but his portfolio may become too concentrated for good risk management and require sales or purchases to secondary discounters in the secondary market.  A primary discounter's business rationale may be to add value by using his expertise to qualify prospective deals, then immediately market them into the secondary market.  In practice, the primary discounter has the responsibility to ensure legitimate transactions, adequate documentation, and sound guarantees.  His ability to sell into the secondary market depends on his reputation.

Other

Other parties may be involved and earn a fee.  Insurers may absorb part of the financial or commercial risk, placement agents may be compensated for matchmaking, and others may facilitate parts of the commercial or financial transaction.


## Secondary Players

Notes are sold by originators to traders or investors in a secondary market.  Use of the label "secondary" does not imply a subsidiary role.  The secondary market directly supports the primary market by providing liquidity, many participants, and market prices.  This backing also helps keep prices stable and lower than they might be otherwise.   Knowing that paper can be resold, and constant exposure in the secondary market, helps originators know and maintain realistic, moderate rates.

An additional characteristic of the secondary market influences the transactions that take place.  Note sales take place between two financial organizations, often regulated institutions.  This means that transactions can be executed quickly, certain standards and procedures can be assumed, a level of trust exists, and more complex trades can be arranged.

Traders

Traders smooth the workings of the secondary market by attempting to buy when and where prices appear to be low, and selling when high. They bridge the networks of originators to the networks of other traders and investors. They may be part of units that also trade currency, bonds, and other securities, providing indirect linkage among rates for the several instruments.

Notes may pass through several traders before maturity, picking up several endorsements.

Investors
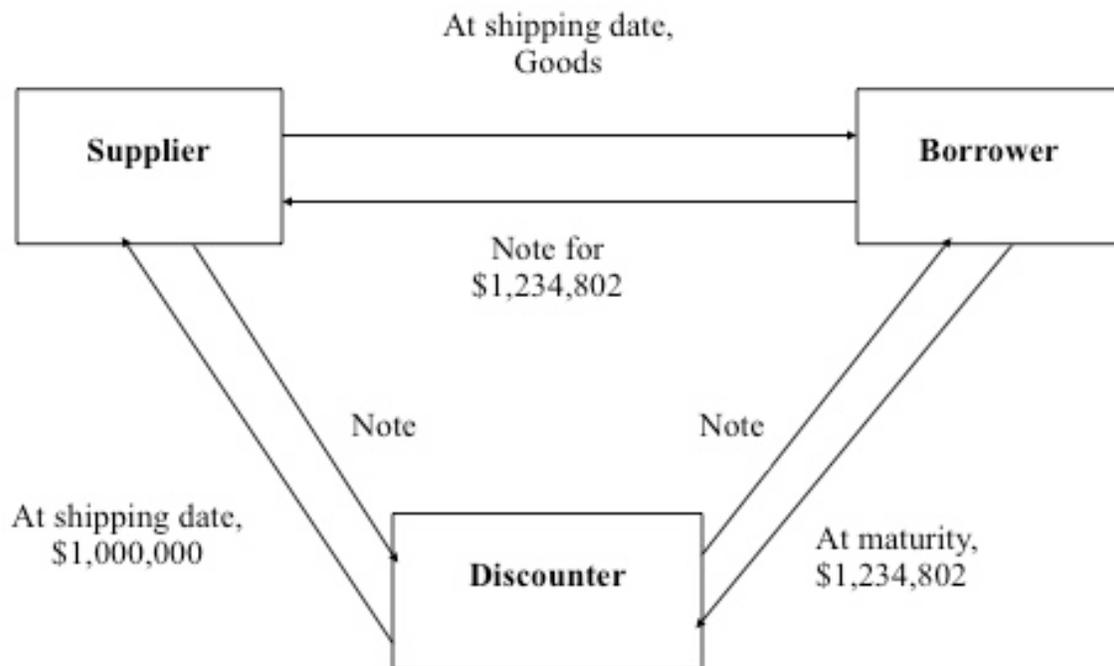


Investors may be financial or other organizations or individuals with excess funds at various times and for various terms. The interests and capabilities of these secondary market participants differ somewhat from those of originators and traders. The investor will tend to be a more purely financial entity with lower business development costs, and buy from a number of sources to produce a balanced portfolio.

Although influenced by money market rates, the secondary market for discounted paper is more stable than pure financial plays because it is short to

medium term, is funded by a very diverse set of payers, and is founded on real business transactions.

## Where the Buck Stops – Example 1

Because trade contracts are ne‐ gotiated between the sup‐ plier and borrower and prices may in‐ clude fi‐ nancing, it is not always clear who is really paying the fi‐ nancing costs.

| Borrower Pays FACE AMOUNT | $1,234,802 | | |
|---|---|---|---|
| | Borrower Interest $113,670 (x%) | | |
| PRINCIPAL | $1,121,132 | | |
| | Discount Interest $222,454 (y%) | Total Financing Cost $234,802 | |
| Gross Proceeds | $1,012,348 | | |
| | Fees $12,348 (1% of Face) | | |
| NET PROCEEDS to supplier | $1,000,000 | | |
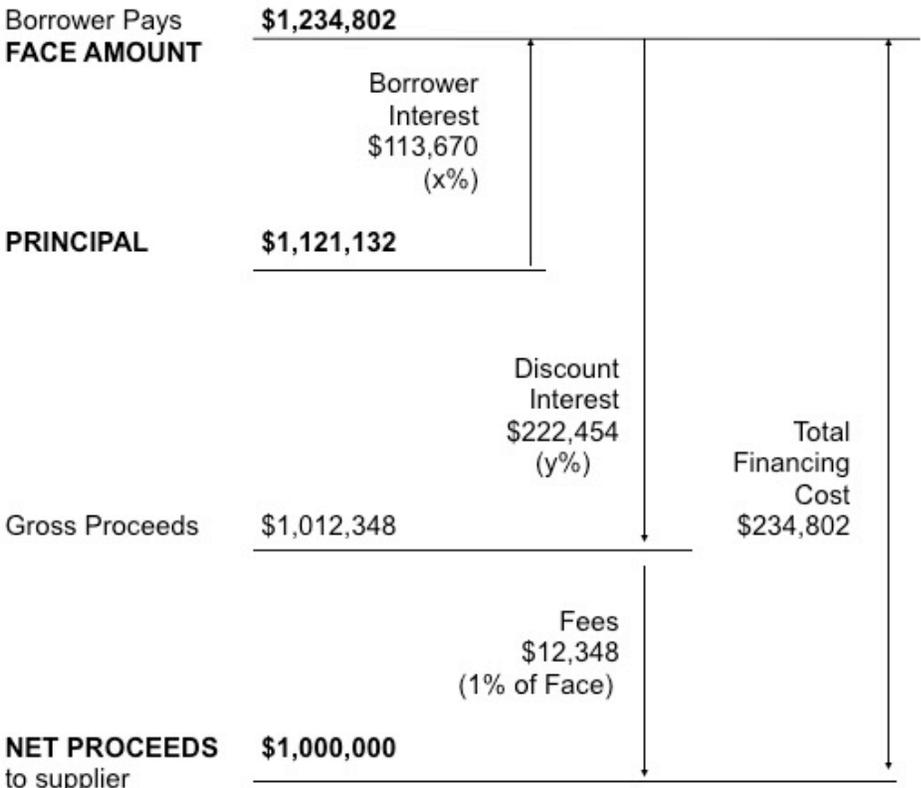
The cost of the financing is usually borne by the borrower, who wanted the fi‐ nancing in the first place, and who is the primary beneficiary.

However, the total financing cost can be shared between the supplier and the borrower in any proportion, depending on their relative desire to close a deal. This section uses an example to illustrate how explicit and implicit interest can shift costs between the supplier and borrower.

The Transaction Flows

A simple transaction to fund the purchase of goods worth $1,000,000 illus-trates the flow of goods, notes, and cash among the parties. As shown in the Exhibit 1, goods shipped to the borrower worth $1,000,000 are exchanged for a note with a face amount of $1,234,802 from the borrower. On the same date, the supplier further exchanges the notes for $1,000,000 in cash by selling the notes to the discounter. The supplier is thus satisfied and has completed his involvement in the financial transaction. The discounter holds the notes until maturity at which point he exchanges them for $1,234,802. The difference be-tween the two amounts shown, the amounts paid out and received, $234,802, the discount, is the total financing cost.

**Exhibit 1: Example 1 Transaction Flows**

The components of the total cost and who pays them can be seen from Exhibit 2, which introduces a third key amount, the principal (contract amount).

**Exhibit 2: Schematic of Amounts**

Two negotiations took place in anticipation of the sample transaction. First, the borrower agreed to pay a financing cost of 5% interest (more about that later) on the "amount of the contract", in effect a principal amount.

Second, the supplier discussed selling the notes to the discounter who would charge 10% interest plus a fee of 1% on the face value of the note.

Given these constraints, there is some principal amount of money (to be calculated) on which 5% interest could be charged such that the resulting amounts to be repaid when discounted using an interest rate of 10% would produce

$1,000,000 to the supplier.  That principal amount is shown in Exhibit 2 as $1,121,132.  This principal becomes the contract amount agreed upon between the borrower and supplier.

Calculation Procedure

Logically, the starting point is the principal amount.  Interest on that amount is charged at 5%.  The interest is added to the principal to find the face, or repayment, amount of the notes.  The discount and fee are deducted from the face amount to find the Net Proceeds to the supplier.

In this example, the principal was calculated in such a way that the borrower pays the total financing cost.  A lower principal could have been specified which would have shifted part of the financing cost to the supplier, a choice he might make in order to secure a sale.  The practical effect would be a lower face amount and consequently lower Net Proceeds to the supplier.

Stated another way, the supplier adds an amount of $121,132 to the raw price of goods to develop a total selling price.  To this amount is added the $113,670 explicit interest to arrive at a total financing cost, consisting  of three parts:

| | | |
|---|---|---|
| Implicit interest | $108,784 | |
| Implicit fee | 12,348 | |
| Contract price increase | | 121,132 |
| Explicit interest | | 113,670 |
| | | |
| TOTAL FINANCING COST | | $234,802 |

The overall result is that the borrower pays a total of $1,234,802 at a future date for goods received "today" worth $1,000,000.

Simplest Measures of Financing Cost

The next Section explains how the interest amounts are calculated, but two simple overall measures of the financing cost can be seen already.  The total finance cost of $234,802 can be expressed either as a percentage of the value of the goods, or as a percent of the repayment amount.

To make these percentages comparable to other measures, they must be normalized to a standard period — a year.  The life of the note (tenor) in this example is 2.0 years.  The finance cost, including both interest and fee, expressed as an annual percentage of the goods would be:

Simple Interest = 234,802/(1,000,000×2.0) = 11.7%

or, as a percentage of the repayment, or face, amount:

Straight Discount = 234,802/(1,234,802×2.0) = 9.5%

To present lower numbers, these measures are more likely to be quoted ex-cluding fees:

Simple Interest = 222,454/(1,012,348×2.0) = 11.0%

Straight Discount = 222,454/(1,234,802×2.0) = 9.0%

## Calculating Interest, Etc.

Discount Interest

The use of the terms "interest" and "discount" in connection with trade paper is confusing.  Historically, a short-term note was purchased at a discount from its face amount, with the amount of the discount calculated as a percentage of the face amount, called the straight discount rate.  The straight discount rate was applied for the proportion of the year the note was outstanding, or days-outstanding/365.  This method has the virtue of simplicity.

The straight discount method is inappropriate for longer-term notes because it is inconsistent with compound interest calculations used for most lending, which is based on the funds advanced.  So, to identify when a compound inter-est rate on the amount advanced is used to calculate a discount, the term discount-to-yield (DTY) is used.  A DTY rate is the compound interest rate ap-plied to some base, proceeds or principal, used to calculate a discount amount.  That discount amount can be checked by subtracting it from the face amount to find the base amount which was used as the starting point.

Compounding the Problem

This Section first justifies the use of compound interest, then demonstrates how it produces the discount used in Example 1.  Compounding is used not only because it produces greater interest revenue but because it corresponds to sound accounting principles.

Consider a note due at the end of four accounting periods after disbursement. At the due date, both the amount advanced ($1,000,000) plus interest will be due. But at the end of the first accounting period the amount due to the lender will be the amount disbursed plus the interest earned during that first period. Thus, the lenders account will show:

| Asset | Amount |
|---|---|
| Funds advanced | $1,000,000 |
| Fee earned, not received | 12,348 |
| Interest earned on 1,012,348, not received | 51,461 |
| | |
| TOTAL | $1,063,809 |

The assets outstanding at the end of the first period, upon which interest should be earned during the second period is $1,063,809. That is, the earning assets at the end of each period includes the interest earned but not received during that period, the essence of compounding.

## Interest Calculation Example

To demonstrate the definition of discount interest, it is calculated for Example 1, beginning with the amount to be financed, a net proceeds of $1,000,000 and a fee of $12,348, for a gross proceeds of $1,012,348 to be financed over four semiannual periods, a total of two years. Well not quite. The due date is 4 January 2000, three days and the first business day beyond the anniversary of 1 January 2000. This means that the total tenor of the note is 733 days, not 2x365=730 days. Using the market standard calculation convention period lengths of 183, 182, 183, 182 days and a final period of 3 days, account for the total of 733 days.

The day basis parameter is also used in calculating discount interest. The daily interest rate is found by dividing the nominal annual rate of 10% by 360, a convention used by banks and for US dollar loans.

The interest in each of the four periods is:

$$I_n = \text{Principal} \times \text{rate}/360 \times \text{days in each period}$$

$I_1 = \quad 1{,}012{,}348.02 \times 0.10/360 \times 183 \ = \ 51{,}461.02$

$I_2 = \quad 1{,}012{,}348.02$
$\qquad\quad \underline{\ \ 51{,}461.02}$
$\qquad\quad 1{,}063{,}809.04 \times 0.10/360 \times 182 \ = \ 53{,}781.46$

$I_3 = \quad 1{,}063{,}809.04$
$\qquad\quad \underline{\ \ 53{,}781.46}$
$\qquad\quad 1{,}117{,}590.50 \times 0.10/360 \times 183 = \ 56{,}810.85$

$I_4 = \quad 1{,}117{,}590.50$
$\qquad\quad \underline{\ \ 56{,}810.85}$
$\qquad\quad 1{,}174{,}401.35 \times 0.10/360 \times 182 = \ 59{,}372.51$

$I_5 = \quad 1{,}174{,}401.35$
$\qquad\quad \underline{\ \ 59{,}372.51}$
$\qquad\quad 1{,}233{,}773.86 \times 0.10/360 \times 3 \qquad = \ \underline{1{,}028.15}$

Total Discount $\qquad\qquad\qquad\qquad 222{,}453.99$

The face amount of the note, shown in Exhibits 1 and 2, is verified to be $1,234,802.01:

| | |
|---|---|
| Net Proceeds | $1,000,000.00 |
| Fee | 12,348.02 |
| | _____.__ |
| Gross Proceeds | 1,012,348.02 |
| Discount DTY Interest | 222,453.99 |
| | _____.__ |
| Face | 1,234,802.01 |

The above process verifies the discount amount assuming that the Fee, 1% of the face, and gross proceeds are known.  In practice, of course, the interdependence of the variables requires solving simultaneous equations.

Base Rates

A discounter's funds may come from capital, borrowing, managed pools, or

some combination. The discounter may choose to match the term of a borrow-ing to the tenor of notes, or may choose to borrow successive short-term funds to cover longer-term notes. The cost of funds may therefore vary considerably according to source, commitment date, disbursement date, and term of fund-ing. The interest rate charged to a borrower can be either a base rate indicat-ing cost of funds plus a margin, or an all-in rate.

For convenience or competitiveness, however, the London Interbank Offering Rate (LIBOR), an internationally recognized cost of money rate, is often used as a surrogate for actual cost of funds. Looking forward to more sophisticated treasury functions, different base rates may be used that relate more directly to funding methods. This may result in more competitive quotes for a discounter with a truly lower cost of funds or higher hurdle rates from a supplier's melded cost of corporate funds.

Base rates are usually applied in one of three ways:

*Average Life*. The simplest is to determine the cost of funds at the average life of a set of notes and use that rate for each note upon disbursement, regardless of tenor. This is conceptually sound when the rate curve is a straight line over the life of a set of notes, and the amount of each note is about the same.

*Matched Rate*. The base rate for each note is applied to each note according to its tenor. This method compensates for a wilder base rate curve and unequal note amounts, and is conceptually sound when funding periods are matched to the note tenors.

*Floating Rate.* The rate applied to each note for each period is adjusted at the beginning of each specified period. This method lowers lending risk when funds are borrowed period by period.

This is the most cumbersome alternative because it requires periodic rate setting and may affect resale of the notes. It may require a separate set of notes for interest payment, which may be sold separately from those cov-ering principal repayment.

## Average Life

Average Life is the average time outstanding for a set of notes, weighted by their face amounts.  Using a set of four notes, Example 2, an Average Life would be:

| Note | Days Outstanding | | Face Amount | | Product (Days x Face) |
|------|-----------------|---|-------------|---|----------------------|
| Note 1 | 181 | × | 1,197,219 | = | 216,696,653 |
| Note 2 | 368 | × | 1,171,232 | = | 431,013,376 |
| Note 3 | 546 | × | 1,142,525 | = | 623,818,830 |
| Note 4 | 733 | × | 1,115,632 | = | 817,758,051 |
| TOTALS | | | 4,626,608 | | 2,089,286,910 |

2,089,286,910 / 4,626,608 = 451.58 days

451.58 days / 365 = **1.2372 years**

A shortcut can also be used, using the number of months outstanding

| Note | Months Outstanding |
|------|-------------------|
| Note 1 | 6 |
| Note 2 | 12 |
| Note 3 | 18 |
| Note 4 | 24 |
| TOTALS | 60 |

60 / 4  = 15 months
15 / 12 = **1.25 years**

In this case the results are quite close because of the particular numbers; in other cases the results will differ considerably.

## Commitment Fee

A commitment fee can also be charged by a discounter to compensate him for "reserving" funds.  This is often calculated as a percentage of the total face amount of the notes over the period from a commitment date to the disbursement date.  This fee may be paid in advance, at time of closing, or financed by

the notes themselves.

## Grace Days

Additional discount interest may be charged to compensate a discounter or subsequent noteholder for delays in collection of repayment at maturity. When used, discount interest is charged over the number of days from disbursement to maturity **plus** the number of grace days.

Since it is normally included in an original discount amount at time of disbursement rather than at maturity, grace period interest is ,in effect, an insurance premium. If the face amount is collected on time, the interest on grace days increases the effective rate. If collected later than the number of days charged, the noteholder has lost. Viewed another way, the grace period interest is just another fee paid to the discounter.

## Borrower Interest

As seen in Exhibit 2, two interest figures may be found in a discounted note. The borrower interest is charged on some agreed–upon principal amount.

Calculation of borrower interest follows the same pattern as for discount interest but, for any particular transaction the chosen parameters may differ. For example,

| Parameter | Discount Interest | Borrower Interest |
|---|---|---|
| Extend Maturities to business days | Yes | No |
| Day basis | 360 | 365 |
| Compounding | Yes | No |
| Base rate used | Yes | No |
| Interest on | Note Net | Prin. Balance |

The period covered may also be different. borrower interest begins on the day the notes are issued. discount interest may begin later, whenever the note is accepted by a discounter and funds are disbursed by the discounter. This difference may also cause a difference in the base rates used. The shorter period covered by discounting may entail shorter term rates.

## True Financing Cost

Whatever the explicit amount of borrower Interest, the borrower's contribution to financing cost is the difference between (a) the face amount of the notes, and (b) the value of the goods received.

If the supplier receives the value of the goods from the discounter, the borrower will have paid the full financing costs. If the supplier receives less, the borrower will have paid only a part of the total, and the supplier will have paid the remainder. If the supplier were to receive more than the cost of the goods, then he would have made a profit on the financing, and the borrower would have paid more than the external financing cost.

## Internal Rate of Return

The typical discount calculation assumes an unusual convention for period lengths, and a 360-day year basis. Other financial instruments use other stylized conventions, often related to ease of calculation or communication within the context for that instrument, or historical patterns.

There is one standard method which yields an answer independent of such details and which can be used with any instrument. The Internal Rate of Return, IRR, involves only three factors: cash out, cash in, and elapsed time intervals. As applied to a discounted note, these are the net proceeds, face amount, and tenor.

The number for Example 1 is:

$$IRR = (\text{Cash Out} / \text{Cash In})^{365/\text{Days Outstanding}} - 1$$

$$IRR = (1{,}234{,}802.01/1{,}000{,}000)^{365/733} - 1 = 11.1\%$$

## FOUR MEASURES OF FINANCING COST

Four measures of financing costs can be used, either for each note of a set, or as an aggregate for the set of notes as a whole. For the note defined as Example 1 in an earlier sections the four measures are summarized:

| Measure | Rate | Including Fee ? | Compounding |
|---|---|---|---|
| Simple Interest | 11.0% | No | No |

| | | | |
|---|---|---|---|
| Int. Rate of Return | 11.1 | Yes | Yes |
| Discount-to-Yield | 10.0 | No | Yes |
| Straight Discount | 9.0 | No | No |

Which one is correct?  All are valid measures in context, and when clearly labeled.  The DTY rate is an industry standard, quoted by discounters and can be used to compare competing bids prepared on that basis.  It can also be used to compare the cost of a commercial loan prepared on a similar basis.  For these comparisons as well as all other instruments, the IRR is a useful measure.

To the extent that all of the fees go to the discounter, the IRR cost to the borrower is the same as the IRR on revenue to the discounter.  If fees are paid out to third parties such as agents or insurers, the borrower cost will be higher than the discounter income.

The straight discount rate will always be the lowest figure because it is based on the higher face rather than Net Amount, and because it is not compounded.

However, within the calculations of each measure, different practitioners may use different parameters and assumptions, usually not disclosed making it difficult to reverse engineer or duplicate a quoted discount.

Each of the four measures can be applied to individual notes or to a set of notes as a whole using average life.  When applied to the whole set, however, the measures will not necessarily give the same results as when applied to each note and vice versa. Depending on the

> allocation of fees
> grace days
> tenors of each note
> base rates
> compounding periods and method,

the values for each note within a set may differ from each other and from the aggregate.

Grace days illustrate the point.  Five days grace on a 180-day note increases the discount on that note relatively more than five days grace on a two-year note.  The IRR and straight dis
count rates will be greater on the shorter-term note.


## How Big is 10%?  Bigger than 10%

Different ways of expressing rates can yield different numbers for the same situation. but even within any single method of expression, the amount of interest can be increased above that implied by a nominal rate by changing other calculation parameters, or factors.

To illustrate, simple interest of 10% is charged on a one year note issued on 1 January 2000 that yields $1,000,000 net proceeds to a supplier. The following Exhibit shows how the obvious base interest of $100,000 grows as parameters are changed.

| Parameter | Amount | IRR |
|---|---|---|
| Base, simple interest | $100,000 | 10.00 |
| PLUS | | |
| Daily interest on 366th day | 274 | 10.00 |
| Value date to 2 Jan 2001 | 274 | 10.00 |
| 365/360 | 1,396 | |
| 5 days grace | 1,389 | |
| Semiannual compounding | 2,272 | |
| 2% commitment fee, 60 days | 3,763 | |
| Interest on commitment fee | 399 | |
| Other fee 2% of Face | 25,214 | |
| TOTAL | 135,481 | |

The nominal IRR of 10% grows to 13.47%. because these factors interact, the order of the buildup can alter the effect of each element but the overall effect will be similar.