

## The Cost of Float to a Firm: Commercial Banking Treasury Management Analysis

**Patricia R. Robertson**

### Case Description

This case is ideal for an upper-level finance course that has an emphasis on short-term financial management. Despite significant advancements in electronic payment systems, most U.S. firms continue to pay invoices with paper checks mailed to suppliers. So long as the checks are received by the due date, firms are in compliance with supplier credit terms. However, paper checks must be processed and recorded by the supplier, deposited in the supplier's bank, and cleared against the payer's bank before the cash is transferred from the payer's checking account to the supplier's checking account. This delay in the conversion of a check to cash is known as float and has a cost to the receiver of a check.

This case includes elements to measure and quantify the cost of float from the perspective of the receiver of a check using time value of money principles. In addition, the case includes an analysis on how services provided through the Treasury Management divisions of commercial banks can shorten float time and enhance the value of the firm's operating activities.

The case can be used to supplement the course curriculum or as a stand-alone assignment. It can be offered as an individual or as a team-based project.

### Case Data / Information

You are conducting an analysis of a firm's collection float. The analysis assumes an average 30-day month and uses a 10% (k) opportunity cost. Show all work for the complete exercise.

1. A firm receives average monthly remittances of \$23,637,000 (or, \$787,900/day). Remittances are paper checks which have been organized in the chart below based on the time it takes to clear the checks ("Collection Float"). Using the data and formulas below, calculate (1) Average Daily Float (\$), (2) Average Days Float (#), and (3) the Cost of Float (\$). Interpret the meaning of all calculations.

Monthly Remittances	×	Collection Float	=	Float
\$12,750,000	×	2	=	
\$3,400,000	×	3	=	
\$4,975,000	×	5	=	
\$2,512,000	×	6	=	
<b>\$23,637,000</b>				

Average Daily Float (\$) = Float ÷ # Days in Month

Average Days Float (#) = Float ÷ Monthly Remittances

Cost of Float (\$) = Average Daily Float x Opportunity Cost (k)

Unlike consumer and small business accounts, corporate checking accounts are subject to “account analysis.” Below is the firm’s most recent monthly bank analysis statement for a typical 30-day month. It includes all the commercial checking services used last month, along with the corresponding unit price and the number of units used for each service. During this same month, the earnings credit rate (ecr) paid by the bank was 0.74% (.0074).

Service Description	Price	Units	Charges
Account Maintenance	\$35.00	43	\$1,505.00
Cash Deposited (\$3.50/\$1,000)	\$3.50	190	\$665.00
Cash Supplied (per strap)	\$1.25	1375	\$1,718.75
Deposits Credited	\$0.75	942	\$706.50
Items Deposited	\$0.15	1736	\$260.40
Returned Items	\$22.00	18	\$396.00
Items Paid	\$0.32	983	\$314.56
Stop Payments	\$40.00	8	\$320.00
Electronic Debits	\$0.15	1287	\$193.05
Electronic Credits	\$0.20	1330	\$266.00
<b>Total Charges for Services (Analysis Charges)</b>			<b>\$6,345.26</b>

- Using the data from the chart above and the worksheet and formula below, calculate the “Net Analysis Position” based on the average balances maintained by the firm at the bank during the month. To do this, calculate the value of the firm’s balances for a 30-day month and complete the rest of the Analysis Statement. Use the “Average Daily Float (\$)” calculated in the previous question for “Average Float” below in the worksheet. The bank does not give earnings credit for amounts it is required to hold on deposit at The Federal Reserve (10% of the “Average Collected Balance”).

$$\text{Value of Balances} = \text{Average Available Balance} \times \left[ \left( \frac{\text{ecr}}{365} \right) (n) \right]$$

- ecr = Earnings Credit Rate (.74%, or .0074)
- n = number of days (30)

**Balance Information**

Average Ledger Balance	\$3,545,625.00
Less: Average Float	_____
= Average Collected Balance	_____
Less: Reserve Requirement (10%)	_____
= Average Available Balance	=====

**Earnings Credit Calculation**

Total Analysis Charges	_____
Value of Average Available Balance	_____
Net Analysis Position	_____

- Interpret the information presented for the firm’s Analysis Statement. Did the firm maintain balances in the account during the month sufficient to offset Analysis Charges? Include a comment on how the firm compensated the bank for the services it used (balances versus fees).

A different bank is pursuing the business of the firm and has offered treasury management services that are expected to shorten collections float from the average float time (“Average Days Float (#)”) calculated in the first question. The firm has provided to the new bank analysis statements from the existing bank, and the new bank has presented the firm with a proposal. The new bank is offering the same credit facilities, investment products, and has similar conveniences for the firm and its employees. Therefore, the firm is making the decision to stay at the existing bank or move to the new bank solely based on benefit from the treasury management services. Based on the size and location of the new bank, the bank expects to reduce the firm’s collections float by 1.5 days if the firm signs up for both Lockbox and Zero Balance services. These services will add new analysis charges. Other differences between the banks include the ecr (.63% for this same month) and the overall pricing for other checking account services.

- If “Average Days Float (#)” is reduced by 1.5 days from the time calculated in Question 1, re-calculate the “Average Daily Float (\$)” and the “Cost of Float (\$)”.

<b>Monthly Remittances</b>	×	<b>Collection Float</b>	=	<b>Float</b>
\$23,637,000	×		=	
<b>Average Daily Float (\$) = Float ÷ # Days in Month</b>				
<b>Cost of Float (\$) = Average Daily Float x Opportunity Cost (k)</b>				

- Another method to quantify the impact of float in the Net Present Value (PV) method. Based on the shortened collections float by 1½ days and using average daily remittances received by the firm (from Question 1) and the formula below, calculate the improvement in PV received as a result of implementing the services (ignore the cost of the services). Tip: This includes two calculations (PV for present float time and a separate calculation for PV with the improved float time).

$$PV = \frac{FV}{1 + (k \times n / 365)}$$

- FV = Daily remittances (from Question 1)
- k = opportunity cost (10% or .10)
- n = number of days (30)

6. Assuming the improvement in collections float is permanent and using the formula below, calculate the perpetuity value from installing these services. Tip: Use a daily periodic interest rate in the denominator of the equation so that it matches the frequency of the cash flow in the numerator of the equation.

$PV_{Perp} =$	<b>Improvement in NPV</b>
	<i>i</i>

- $i =$  periodic opportunity cost ( $k/365 = .10/365$ )

7. The benefits calculated above do not come without a cost. Detail the cost of the services at the new bank. This includes the fees for regular commercial checking services plus the new treasury management services. Assume the services (and the number of units used for each) is the same as presently used at the existing bank. For the three new treasury management services (listed last on the chart below), assume 1 unit for Lockbox, 3 units for Zero Balance Accounts, and that all of the 1,736 “Items Deposited” are routed through the Lockbox (this is the entry for “Lockbox Items,” and is incremental to the charge for the “Items Deposited”). What is the difference between the two banks in “Total Analysis Charges?”

Service Description	Price	Units	Charges
Account Maintenance	\$30.00		
Cash Deposited (\$3.50/\$1,000)	\$4.00		
Cash Supplied (per strap)	\$1.75		
Deposits Credited	\$0.85		
Items Deposited	\$0.12		
Returned Items	\$25.00		
Items Paid	\$0.25		
Stop Payments	\$45.00		
Electronic Debits	\$0.20		
Electronic Credits	\$0.25		
Wholesale Lockbox	\$300.00	1	
Lockbox Items	\$0.10	1736	
Zero Balance Account	\$50.00	3	
<b>Total Charges for Services (Analysis Charges)</b>			

8. Estimate the portion of the new bank fees that will be covered by existing balances by recalculating the “Net Analysis Position.” Like before, calculate the value of the firm’s balances for a 30-day month and complete the rest of the Analysis Statement. Many of the inputs change. Modify (1) the “Average Float” for the new bank using “Average Daily Float” from your work in Question 4, (2) the ecr for the new bank (.63%, or .0063), and (3) the “Total Analysis Charges” at the new bank from your work in Question 7. Discuss the results.

**Balance Information**

Average Positive Ledger Balance	\$3,545,625.00
Less: Average Float	_____
Average Collected Balance	_____
Less: Reserve Requirement (10%)	_____
Average Available Balance	=====

**Earnings Credit Calculation**

Value of Average Available Balance	
Total Analysis Charges	_____
Net Analysis Position	_____

- Calculate the difference in the “Net Analysis Position” between the two banks. Discuss the results.
- Determine if the benefit of moving to the new bank justifies the incremental cost. Should the firm change banks? Tip: Calculate the perpetuity cost of the difference between the “Net Analysis Position” calculated in the Question 9 and compare it to the perpetuity value of the services calculated in Question 6. Make sure to calculate the perpetuity cost based on the monthly difference in fees (using a monthly periodic interest rate in the denominator of the equation so that it matches the frequency of the cash flow in the numerator of the equation).

$PV_{Perp} =$	<b>Incremental Fees</b>
	$i$

$i = \text{periodic opportunity cost } (k/12 = 10\%/12)$

- If the firm chooses to change banks, it must decide if it will pay for the services with balances or fees. If the firm opts to pay for all services at the new bank with balances, using the formula below, calculate the amount of balances the firm would be required to maintain. This must consider the cost of all services at the new bank and the ecr paid by the new bank. Assume a 30-day month.

$$RCMP = \frac{SC}{(1 - rr)[(ecr/365)(n)]}$$

- SC = Service (Analysis) Charges (from Question 7)
- RR = Reserve Requirements (10% or .10)
- ecr = Earnings Credit Rate (.63% or .0063)
- n = number of days (30)

12. Assume the firm has decided to change banks and install the treasury management services. Should the firm pay for all of these services with balances or fees? Why?

**Author**

**Patricia R. Robertson**

Lecturer of Finance, Coles College of Business, Department of Economics, Finance, and Quantitative Analysis, Kennesaw State University, Kennesaw, Georgia