MBA Teaching Note 07-01
The Change in Net Working Capital in a Capital Investment Project

When working a capital investment problem, we have to determine the annual cash flows on the project. A typical project involves an initial investment at the start and periodic (usually annual) cash flows thereafter. We are told that oftentimes these projects require increases in net working capital. We are led to believe that these increases are necessary to support a project. When a firm increases its investment in fixed assets, its net investment in current assets must often be increased. But seldom are we told why this statement is true. In fact, it is very easy to see, but no textbooks that I know of provide this explanation.

Define the following terms and create three key equations, (A), (B), and (C):

S = sales
CAS = cash sales
CRS = credit sales
Thus, S = CAS + CRS, and
(A) CAS = S - CRS
CGS = cost of goods sold
BI = beginning inventory
EI = ending inventory
Let the change in inventory be ΔINV = EI - BI
CAP = cash purchases of inventory
CRP = credit purchases of inventory
By definition, CGS = CAP + CRP - ΔINV, and
(B) CAP = CGS + ΔINV - CRP
SGA = selling/general/administrative expenses
CASGA = cash SGA expenses
CRSGA = credit SGA expenses
Thus, SGA = CASGA + CRSGA, and
(C) CASGA = SGA - CRSGA

The change in net working capital is an adjustment that allows us to convert accounting numbers into cash flow. Letting CF = cash flow, by definition cash flow is as follows:

CF = CAS – CAP – CASGA.

That is, cash flow is cash sales minus cash purchases minus cash SGA expenses. Now let us see how we can get that figure from the accounting numbers. The accounting numbers are sales, cost of goods sold, and SGA expenses. We can use these numbers plus an adjustment to net working capital to obtain cash flow as shown in the following manner.

CF	=	(A)	– (B)	- (C)
	=	S – CRS	- (CGS + ΔINV – CRP)	– (SGA – CRSGA)
	=	S – CRS – CGS – ΔINV + CRP – SGA + CRSGA		
	=	S – CGS – SGA - CRS - ΔINV + CRP + CRSGA		

The first three terms on the right-hand side are accounting figures from the pro forma income statement for the project. The other terms are a reduction for any increase in net working capital. The change in net working capital is, by definition, increases in credit sales and inventory minus increases in credit purchases and credit SGA expenses:

ΔNWC = CRS + ΔINV – CRP – CRSGA.

Thus,

CF = S – CGS – SGA - ΔNWC

Thus, when constructing the cash flow figure, we start with the accounting number for sales, deduct the accounting numbers for cost of goods sold and SGA expenses, and then deduct any increase in net working capital. The net working capital deduction is best seen as an adjustment that converts the accounting number into a cash flow number. As an alternative, we

might prefer to estimate the cash flow number directly rather than start with the accounting numbers and make an adjustment. We could dispense with the accounting statement completely were it not for the fact that taxes, which is definitely a cash flow figure, must be computed from the accounting figure for profit.