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A Note On Revenue Recognition And Asset Measurement*

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Forward

Carl L. Nelson wrote several versions of the paper, "A Note on Revenue Recognition and Asset Measurement" in the late 1960s and early 1970s, but it was never published. The version that I revised was written in 1972. When Nelson wrote the paper, he was George O. May Professor of Financial Accounting at Columbia University Graduate School of Business. As such, he held one of the few endowed financial accounting professorships in the world at that time, and was recognized

as one of the leading accounting theorists of the day. He also won the *Outstanding Accounting Educator Award* of the American Accounting Association in 1975, and still has a loyal following of former students.

Although written over thirty years ago, this paper is still timely. It concretely illustrates with simple numbers

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*The authors appreciate the helpful comments of Daniel L. Jensen (Ohio State University).

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as well as words how revenue recognition and asset valuation articulate and interrelate. The key points are as follows:

- When revenue is recognized at the *time of production*, accounts receivable and inventory are measured in terms of the *same* attribute, selling price (exit prices, output values). A common example is the percentage of completion method for profitable long-term contracts: Revenue is recognized pro rata during production. Construction in progress [inventory] is measured at a percentage of contract (selling) price reduced by progress billings to avoid double counting. The result is consistent valuation of accounts receivable and construction in progress inventory at selling price.
- When revenue is recognized at the *time of sale*, the usual situation for most companies, accounts receivable and inventory are measured

in terms of *different* attributes. Accounts receivable is measured in terms of selling price (exit prices, output values) reduced by an allowance for bad debts, but inventory is measured in terms of historical cost (entry prices, input values). The result is inconsistent valuation of accounts receivable and inventory. Adding together accounts receivable and inventory in the balance sheet is akin to adding together apples and oranges.

- When revenue is recognized at the *time of cash collection*, accounts receivable and inventory are measured in terms of the *same* attribute, historical cost (entry prices, input values). A common example is the installment method: Gross profit (i.e., revenue less cost of goods sold) is recognized pro rata during collection. At the time of sale, the installment receivable is measured at amounts owing from customers, reduced by deferred gross profit, giving a net

book value equal to the cost of goods sold. As collections occur, the installment receivable is measured at remaining amounts owing from customers, reduced by remaining deferred gross profit, giving a net book value equal to a percentage of the cost of goods sold. Once again, the result is consistent valuation of accounts receivable and inventory at historical cost.

Understanding that consistent attribute measurements result when revenue is recognized at the time of production makes more apparent that mixed attribute measurements result when revenue is recognized at the time of sale. It also makes more apparent that consistent attribute measurements also result when revenue is recognized at the time of cash collection, provided the deferred gross profit account is viewed as a receivable contra rather than some anomalous liability.

I only slightly revised the Nelson paper. I changed a few terms to conform to current prevailing usage and combined conclusions of two earlier versions. By and large, however, I left most of the paper unchanged, in order to retain the inimitable style of Carl L. Nelson.

**A Note on Revenue Recognition
and Asset Measurement**

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Apart from cash, there is no obvious correct way to measure assets. The practical result of this lack is that assets are measured in different ways. Since $A = L + OE$, the method of meas-

uring assets affects the owner's equity and hence affects the reported net income. We can speak of methods of measuring assets or methods of reporting income; there are two ways of saying the same thing. Since income is the result of subtracting expenses from revenue, different methods of reporting income are frequently referred to as methods of recognizing revenue.

Problem

If a firm had no inventory nor accounts receivable at the end of an accounting period, many problems of income measurement would be avoided. All of the goods that had been produced would have been sold; all of the goods that had been sold would have resulted in the collection of cash. The income would be the amount collected from customers less all costs of production, of selling and of collection. If the sales price per unit is \$5.00 (and there are no bad debts), production costs are \$3.00 per unit, selling costs are \$1.50 and collection costs are \$0.10 per unit, the income would be \$0.40 per unit and whether this is multiplied by the number of units produced, the number of units sold or the number of units for which collections are made would make no difference because the same amount of income would result. Revenue could be recognized at the time of sale, at the time of production or at the time of collection with the same result.

The above situation rarely exists. Ordinarily some sales have been made for which the money has not yet been collected. Let us suppose, for instance, that the goods were produced in February, sold in May and the money was collected in July. We know that over the period from May 1 to July 31 the

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Possibility	Income		
	February (production)	May (sale)	July (collection)
A	.00	.00	.40
B	.00	.40	.00
C	.40	.00	.00

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income on this one unit was \$0.40 but was this February income, May income, July income or was part of it income of one month, etc., etc? We cannot give any assured answer to this question but we can certainly say that each of the three activities is necessary to the income generating process. Hence none of these can be said to produce a negative income. One possible answer that is quite generally rejected is to allocate the \$0.40 over the three months; no acceptable basis of allocation exists. As a result, there remain three possibilities from which one must be selected (see Exhibit 1). To simplify as much as possible, it will be assumed that all costs require an immediate cash payment.

Revenue Recognized at Time of Collection

If Possibility A is selected, that is, if income and revenue are reported at the time the cash is collected, the following changes in the various assets, various liabilities and owners' equity will take place:

February (production of goods)	
– Cash	3.00
+ Inventory	3.00

The payment of cash obviously decreases cash. There is an increase in inventories but no change in receivables or in any other asset. No change

takes place in any liability; the firm will have to pay for the selling costs when the goods are sold and the collection costs when the money is collected but these amounts are not liabilities because the services involved with the sale and collection process have not been received. There is no change in the owner's equity; the income will not be reported until the money is collected. Since cash is decreased by \$3.00, inventory is increased and no other changes in balance sheet items take place and since $A=L+OE$, inventory must increase by \$3.00. The inventory is thus measured at cost.

May (sale of goods)

– Cash	1.50
– Inventory	3.00
+ Receivables	4.50

When the goods are sold in May, cash obviously decreases as a result of the payment of the selling costs, the inventory decreases by \$3.00, the previously determined measurement, and receivables increase. No other assets change, no liability is affected (see discussion of liabilities for the February transaction) and owners' equity does not change since the income is not to be reported until the cash is received. Since $A=L+OE$, receivables must therefore increase by \$4.50. The measurement basis of the receivables is

cost, in that to secure the receivables required the expenditure of \$3.00 to produce the goods and \$1.50 to sell them and obtain the claim on the customer.

July (collection of receivables)

+ Cash	5.00
- Cash	.10
- Receivables	4.50
+ Owners' equity	.40

The collection of the \$5.00 increases cash while the payment of \$0.10 for collection activities decreases cash. Receivables were \$4.50 and are now zero so accounts receivable must decrease by \$4.50. Owners' equity increases by \$0.40 because the income is being reported when the cash is collected. These changes result in $A=L+OE$.

If revenue is recognized at the time of collection, both inventories and receivables will be measured at cost. The receivables would probably be reported as

Receivables	5.00
Less: Deferred income	.50
Net	<u>4.50</u>

Revenue Recognized at Time of Sale

If the income is to be reported when the sale is made, the production of goods will have the same effect on assets, liabilities and owners' equity as if the income were reported when the cash is collected.

February (production of goods)

- Cash	3.00
+ Inventory	3.00

Cash is decreased by \$3.00, inventory is increased and no other changes take place. The inventory must therefore increase by \$3.00.

May (sale of goods)

- Cash	1.50
+ Receivables	4.90
- Inventory	3.00
+ Owners' equity	.40

As a result of the sale, cash decreases by \$1.50 (the selling costs), inventory decreases by \$3.00 (the cost) and receivables increase. Because the income is to be reported at this time, owners' equity increases by \$0.40. If $A=L+OE$, receivables must increase by \$4.90 for no other asset and no liability changes.

July (collection of receivables)

+ Cash	5.00
- Cash	.10
- Receivables	4.90

When collection takes place, cash and receivables are the only assets affected. No change takes place in the liabilities or owners' equity.

If revenue is recognized at the time the sale is made, the inventories are measured at cost and the receivables are measured at net realizable value. Upon collection \$5.00 will be received but \$0.10 must be paid in collection costs so that the net amount that will be realized will be only \$4.90. The receivables would probably be reported as

Receivables	5.00
Less: Allowance for collection	.10
Collection cost	<u>4.90</u>

The measurement basis is now inconsistent; inventories are measured at cost while receivables are not. Receivables may be said to be measured at "net realizable value" or simply, "value." The \$4.90 is the net realizable value of the receivable because that is the net amount of cash (\$5.00 less \$0.10) which the firm will receive as a result of owning the receivable. It can also be considered the value in that, if a buyer were willing to make an in-

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vestment which would yield a 0% return, he would be willing to pay \$4.90 for the receivable. It would therefore be the market value of the receivable. The zero rate of return is, of course, unrealistic but the assumption is repeatedly made in accounting thinking. If the expected interval between sale and collection is a lengthy one, an adjustment in the value should be made to recognize the fact that the receivable does not have a value of \$4.90.

Revenue Recognized at Time of Production

If the income is to be reported when the goods are produced, the effect of the production of goods will be:

February (production of goods)	
– Cash	3.00
+ Inventories	3.40
+ Owners' equity	.40

Cash decreases by \$3.00 and inventories increase. As income is reported when goods are produced, owners' equity increases by \$0.40. Since no other assets change, no liabilities change, and $A=L+OE$, inventories must increase by \$3.40.

May (sale of goods)	
– Cash	1.50
+ Receivables	4.90
– Inventories	3.40

The sale decreases cash by \$1.50 (selling costs) and inventories by \$3.40. Owners' equity does not change, in as much as income was reported at the time the goods were produced. No other assets change and no liability changes. In as much as $A=L+OE$, receivables must increase by \$4.90.

July (collection of receivables)

+ Cash	5.00
– Cash	.10
– Receivables	4.90

The changes that take place at the time of collection are the same when income is reported at the time of production as when it is reported at the time of sale.

If revenue is recognized at the time the goods are produced, both receivables and inventories are measured at net realizable value. The ultimate collection of \$5.00 per unit of inventory will require the payment of \$1.50 for selling costs and \$0.10 for collection costs.

Need for Estimates

The recognition of revenue prior to the time cash is collected requires the use of estimates. These estimates are likely to be incorrect. When the actual costs are known (selling costs if revenue is recognized at the time of production and collection costs if revenue is recognized at the time of production or sale) and the sales price is known, owners' equity will change by the amount of the revision.

The only estimates required in this simple illustration are the sales price, the selling costs and collection costs. In the more general case estimates will be required for the amount of sales returns, sales allowances (price reductions made after the sale takes place), sales discounts, bad debts, and warranty costs. It should be noted that warranty costs are different in nature than other costs in that a liability to the buyer is created when the sale is made.

For the manufacturer, recognition of revenue at the time the goods are sold is the most common accounting method. Many firms implicitly estimate sales returns, sales allowances,

sales discounts, and warranty costs to be zero and hence overstate income. However it is probable that the allowance for bad debts is overstated, hence offsetting this error in whole or in part.

Summary

To summarize, the timing of the recognition of revenue and the measurement basis of assets are related as indicated in Exhibit 2.

Implications for Credit Analysis

The credit analyst is interested in the ability of the firm to meet its obligations and therefore is interested in the cash inflows that will result from the ownership of assets. He would therefore like to know the value of the assets but recognizes that this is an estimate. The cost of receivables and inventory in Possibility A and of inventory in Possibility B tells him nothing about the potential debt paying ability of these assets; it is necessary for him to make his own estimates.

On the other hand, he is not interested in unreliable estimates. If the value of the inventory could be as low as \$1.00 or as high as \$5.80, an estimate of \$3.40 is not very useful. Probably the best conclusion is that Possibility A is best if reliable estimates cannot be made. The conclusion for most firms is that a reliable estimate can be made of the value of the receivables but not of the inventory, which thus leads to Possibility B. It should be noted that this means that the credit analyst must make his own

estimate of the value of the inventory.

In this simple case, the only difference between the amount due from the customer and the value of the receivable is due to the collection costs. In actual situations, the customer might return some of the goods (sales returns), the customer might receive a price adjustment (sales allowances), the customer might take advantage of a discount for prompt payment (sales discounts), or he may fail to pay the entire amount due (bad debts). If receivables or inventories are to be measured at net realizable value, an estimate must be made of all these amounts. If these amounts are small, an estimate of zero is frequently made. The credit analyst must, however, consider the possibility that underestimates of these amounts may have been made.

The analyst must also understand that the balance sheet is prepared with the assumption that the firm is a going concern, that is, that it will continue to operate. If it were to go out of business, collection of receivables may be much more difficult and much more costly. As a result their value to the liquidating firm may be much lower than their value to a going concern. The difference would be even greater in the case of inventories; the value of inventories to a liquidating concern may be far less than their value to a going concern.

<i>Revenue Recognized at Time of</i>	<i>Exhibit 2</i>	
	<i>Asset Measurement</i>	
	<i>Inventories</i>	<i>Receivables</i>
Production	Net Realizable Value	Net Realizable Value
Sale	Cost	Net Realizable Value
Collection	Cost	Cost

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