

months, as shown in tables 1 and 2. If this procedure is followed, the order of magnitude of the interest payments is reversed from that shown above. The beginning balance of \$150 draws \$2.19 interest for one month, so that \$17.81 is left for reduction of principal out of the first installment (table 2). The balance at the beginning of the second month (\$132.19) draws \$1.93 interest, and \$18.07 is left for reduction of principal. The balance at the beginning of the third month is therefore \$114.12. At the beginning of the eighth month, the balance outstanding is \$19.72. At the end of the eighth month, the interest on \$19.72 at 0.01457 is 29 cents. The last payment of \$20 therefore pays off the debt.

Under the *small-loan* method, the monthly rate r is computed at compound interest, as above, but the annual rate quoted is a nominal one, or 12 times the monthly rate. Under the *present-value* or present-worth method, the same monthly rate is converted to an effective annual rate by compounding it monthly for a year; that is, the effective annual rate

$$i = (1+r)^{12} - 1.$$

The compounding of interest may occur either in the accumulation of a sinking fund or in the amortization of a debt. (See footnote 8.) If interest is collected monthly as in the example, from periodic installments before the remainders are applied toward reduction of principal, the resulting effective annual rate is more than 12 times the monthly rate used. The higher the monthly rate, the greater the difference between the nominal and effective rates. From this standpoint, the present-value method is more accurate and therefore superior to the small-loan method. In other words, the computed monthly rate may be applied to monthly balances, thus earning interest on interest, yet per-

mitting the full amortization of the "loan" by the periodic payments within the specified time.

VALIDITY OF METHODS

From the standpoint of a buyer who merely wants to determine whether better terms are offered by seller *A* or seller *B*, it makes little difference which method of computing rates is used—provided the same method is used throughout. Each method will identify the higher or the lower rate of charge on installment contracts. However, relatively few consumers know how to apply even the simplest of these methods, and several of the methods do not provide an accurate measure of the differences between rates. Any method recommended for general use, including use by sellers, should be accurate and as easy as possible to compute.

By this standard, the direct-ratio method appears preferable to any of the other methods. It is highly accurate and relatively easy to use.¹¹ The three other methods described under "Accounting Approach" and the simple-discount method described under "Present-Value Approach," have little mathematical validity. As stated previously, the simple-interest method is too complex to be of practical value to either buyers or sellers.

In summary, it can be stated that of the eight methods described, the compound-interest (small-loan and present-value) methods and the direct-ratio method give the same monthly rate. This monthly rate is the only one by which the terms offered on an installment purchase contract can be compared precisely with the cost of an installment loan having the usual provision for monthly payments of interest on unpaid balances carried

¹¹ While compound-interest methods provide a criterion of accuracy in all calculations pertaining to interest rates, the direct-ratio method gives a monthly rate that is, for all practical purposes, equivalent to the rate by compound-interest methods. In the example, the monthly rate under the small-loan and direct-ratio methods do not differ until the sixth decimal place is reached.