The accounting-and-finance of a solar photovoltaic plant: Economic efficiency of a replacement project

Magni, Carlo Alberto and Marchioni, Andrea

Department of Economics "Marco Biagi", University of Modena and Reggio Emilia

16 May 2019

4th International Conference on Energy and Environment: bringing together Engineering and Economics
Guimarães, Portugal
16-17 May, 2019

The accounting-and-finance of a solar photovoltaic plant: Economic efficiency of a replacement project

Carlo Alberto Magni[1*] and Andrea Marchioni[2]

[1] Department of Economics "Marco Biagi", University of Modena and Reggio Emilia, Italy, School of Doctorate E4E
[2] Department of Economics "Marco Biagi", University of Modena and Reggio Emilia, Italy

* Corresponding author: magni@unimo.it, University of Modena and Reggio Emilia, viale Berengario 51, 41121 Modena, Italy

KEYWORDS
Energy project analysis, investment evaluation, value creation.

ABSTRACT

In this work we illustrate a simple logical framework serving the purpose of assessing the economic profitability and measuring value creation in a solar photovoltaic (PhV) project and, in general, in a replacement project where the cash-flow stream is nonnegative, with some strictly positive cash flows. We use the projected accounting data to compute the average ROI, building upon Magni (2011, 2019) (see also Magni and Marchioni 2018), which enables retrieving information on the role of the project's economic efficiency and the role of the project scale on increasing shareholders' wealth. The average ROI is a genuinely internal measure and does not suffer from the pitfalls of the internal rate of return (IRR), which may be particularly critical in replacement projects such as the purchase of a PhV plant aimed at replacing conventional retail supplies of electricity.

INTRODUCTION

Investment decisions may be evaluated adopting absolute measures of worth such as net present value (NPV), residual income, value added, or relative measures of worth, such as rates of return or benefit-cost indices. The NPV is regarded as a rational measure of value creation, since it correctly quantifies the net effect of the project on shareholders' current wealth (Brealey, Myers and Allen 2011). However, rates of return are more intuitive. For instance, to say "the project has generated a 10% return, better than 8% market return" is more intuitive than saying "at a discount rate of 8%, the project NPV is $150" (Remer, Stokdyk and VanDriel 1993, Remer and Nieto 1995a,b, Graham and Harvey 2001, Ryan and Ryan 2002, Ross, Westerfield and Jordan 2011). Also, a rate of return informs about economic efficiency, that is, how good or bad money is invested, whereas NPV blends economic efficiency and project scale into a unique number.

Among the various rates of return, the internal rate of return (IRR) is a common metric. Unfortunately, it may not exist (or be multiple), especially in replacement projects, where the cash-flow stream is often nonconventional (i.e., cash-flow stream changes sign more than once or never changes sign). We build upon Magni (2011, 2019) and the internal-average-rate-of-return (IARR) approach with pro forma accounting profits and book values to accomplish a comprehensive analysis of a PhV project whose cash-flow stream results in a nonconventional cash-flow stream with no IRR.

This paper aims at introducing theoretical and applicative tools for the analysis, in a firm perspective, of a replacement project in the field of renewable energy, considering the case where conventional retail electricity system (based on supplies from utility) may be replaced by a standalone solar PhV system purchased from a producer, installed on a land property owned by the firm. We describe the project as an incremental economic system, that is, as a deviation of the firm-with-the project from the firm-without-the-project (status quo) in terms of accounting magnitudes. We assume that, in the status quo, a utility bill is paid periodically and a rent from the land is received. The solar PhV plant implies a leasing contract whereby lease payments and operating and maintenance costs are made periodically. After several years, at the expiration date, the lessee may pay a lump sum to acquire the plant, and the system will continue to generate electric power for some years. At the end of its useful life, the plant is removed and the firm incurs disposal costs. If the retail system is replaced by the PhV plant, the incomes, book values and resultant cash flows increase as a result of the lease payment and the terminal outlay for acquiring the plant but decrease by effect of the cost savings (the utility bill). This paper uses the accounting estimations and a benchmark portfolio to assess the PhV's economic profitability via the internal-average-rate-of-return (IARR) approach, and, in particular, the average ROI. This latter exists and is unique and enables understanding how much of the value created is due to the economic efficiency of the project and how much of it is due to the scale of the project.

1. INVESTMENT AND FINANCING SIDE OF A PROJECT

Let P be a n-period investment project. Economically, a project consists of two sides: The investment side and the financing side. The invested side refers to the invested capital, which is divided into two main classes:

- Operating capital, C_t^o, consisting of of net fixed assets and net operating working capital: $C_t^o = \text{NFA}_t^o + \text{WC}_t^o$
- Non-operating or liquid assets, C_t^l (excess cash, marketable securities, and other financial activities).

The financing side of the project refers to the financing raised by the firm for undertaking the project. It can be conveniently divided into two components:

- Debt capital, C_t^d (loans, bonds, notes payable, etc.)
- Equity capital, C_t^e (capital raised by the firm from the firm's owners).

Investment side and financing side balance out, that is,

$$\overbrace{\text{NFA}_t^o + \text{WC}_t^o}^{C_t^o} + C_t^l = C_t = C_t^d + C_t^e$$

The project's income I_t and the project's cash flow F_t are the source of variation of the capital. Both can be split up into operating components and non-operating component (asset side) and into equity component and debt component (financing side). The project's income is the sum of the operating income and the interest income and, at the same time is equal to the sum of the net income and the interest expenses:

$$I_t^o + I_t^l = I_t = I_t^d + I_t^e.$$

Likewise, the project's cash flow is equal to the sum of the operating cash flow and the non-operating (i.e., liquid) cash flow and, at the same time, equal to to the sum of the cash flow to debt and cash flow to equity:

$$F_t^o + F_t^l = F_t = F_t^d + F_t^e.$$

The evolution of capital through time is described by a dynamical equation according to which capital increases with the income produced and decreases with the cash flow extracted from the economic system,

$$C_t = C_{t-1} + I_t - F_t$$

and $C_t^j = C_{t-1}^j + I_t^j - F_t^j$, with $j = o, l, e, d$. At the end of the project, $C_n = 0$ since the transactions are over.

Let Rev_t be the incremental revenues, OpC_t the incremental operational costs, Dep_t the depreciation charge of fixed assets, and τ the corporate tax rate. The after-tax project income is

$$I_t = (\text{Rev}_t - \text{OpC}_t - \text{Dep}_t + I_t^l)(1-\tau) + \tau I_t^d. \tag{1}$$

The project's cash flows, F_t, is the difference between the operating income and the change in operating capital, such that

$$F_t = I_t - \Delta C_t = I_t + \text{Dep}_t - \Delta\text{WC}_t - \Delta C_t^l. \tag{2}$$

2. NPV AND RELATIVE PERFORMANCE METRICS

Let r_t be the project's cost of capital (required rate of return), that is, the interest rate at which funds may be invested or borrowed in a normal, competitive financial market, often called weighted average cost of capital (WACC). The economic (or intrinsic) value of the project at time *t*, V_t, is the value that the project would have if it were traded in the market and is equal to the discounted sum of future cash flows:

$$\mathrm{V}_t = \frac{F_{t+1}}{(1+r_{t+1})} + \frac{F_{t+2}}{(1+r_{t+1})(1+r_{t+2})} + \cdots + \frac{F_n}{(1+r_{t+1})(1+r_{t+2})\dots(1+r_n)}.$$

The value created by a project is measured via its net present value (NPV), which is the difference between the initial economic value, V_0, and the initial cost, $-F_0$. Therefore,

$$\mathrm{NPV} = V_0 - (-F_0) = F_0 + \frac{F_1}{1+r_1} + \frac{F_2}{(1+r_1)(1+r_2)} + \cdots + \frac{F_n}{(1+r_1)(1+r_2)\dots(1+r_n)}.$$

Let $r_t^j, j = o, l, d, e$ be the cost of capital for operating assets, non-operating assets, debt, and equity, respectively. The economic value of each constituent class in *t*, V_t^j, is

$$\mathrm{V}_t^{\mathrm{j}} = \frac{F_{t+1}^j}{(1+r_{t+1}^j)} + \frac{F_{t+2}^j}{(1+r_{t+1}^j)(1+r_{t+2}^j)} + \cdots + \frac{F_n^j}{(1+r_{t+1}^j)(1+r_{t+2}^j)\dots(1+r_n^j)}$$

and its NPV is

$$\mathrm{NPV}^j = F_0^j + \frac{F_1^j}{1+r_1^j} + \frac{F_2^j}{(1+r_1^j)(1+r_2^j)} + \cdots + \frac{F_n^j}{(1+r_1^j)(1+r_2^j)\dots(1+r_n^j)}.$$

The NPV of the project equals the sum of the NPVs of the financings:

$$\mathrm{NPV} = \mathrm{NPV^e} + \mathrm{NPV^d}.$$

Furthermore, it is worth noting that the project's cost of capital, r_t, is equal to the weigthed average of the cost of equity r_t^e and the cost of debt r_t^d, with weights represented by the market values:

$$r_t = \frac{r_t^e V_{t-1}^e + r_t^d V_{t-1}^d}{V_{t-1}^e + V_{t-1}^d}.$$

If the cost of capital is constant through time, $r_t = r$, the project's NPV results

$$\mathrm{NPV} = F_0 + \frac{F_1}{1+r^j} + \frac{F_2}{(1+r^j)^2} + \cdots + \frac{F_n}{(1+r^j)^n}.$$

A project is worth undertaking if and only if it creates value for its equityholders, that is $\mathrm{NPV} > 0$.

Among the various relative performance metrics, the internal rate of return (IRR) of the project is defined as the discount rate x which solves the equation NPV=0:

$$\mathrm{NPV}(x) = \frac{F_1}{1+x} + \cdots + \frac{F_n}{(1+x)^n} - C_0 = 0.$$

Although the IRR is commonly adopted by practioners, its pitfalls are significant, including multiplicity, non-existence, and ambiguous financial nature when the project is not a conventional project.

Consider now the following definition of the Internal Average Rate of Return (IARR).

Definition (Internal Average Rate of Return) *The IARR is equal to the ratio of total profit to total capital invested:*

$$i = \frac{I}{C} = \frac{\sum_{t=0}^{n} I_t}{\sum_{t=0}^{n} C_t}. \tag{3}$$

The IARR in (3) is economically significant for it fulfills the literal definition of a rate of return: An amount of return per unit of invested capital. Since profits and capitals are pro forma accounting values, this rate is an average accounting rate of return. More precisely, it is an average Return On Investment (ROI).

The average ROI exists and is unique, so it may be used in place of IRR by those practioners who are willing to calculate a reliable, internal relative measure of worth without incurring the difficulties of IRR.

Since $\sum_{t=0}^{n} I_t = \sum_{t=0}^{n} F_t$, the average ROI may be alternatively viewed as a cash-flow measure:

$$\overbrace{\frac{I_0+I_1+\cdots+I_n}{C_0+C_1+\cdots+C_n}}^{\text{profit to capital}}=i=\overbrace{\frac{F_0+F_1+\ldots+F_n}{C_0+C_1+\ldots+C_n}}^{\text{cash flow to capital}}.$$

It is a ratio of total profit to invested capital or a ratio of net cash flow to invested capital.

For decision-making purposes, the average ROI should be compared to a suitable minimum attractive rate of return (MARR), which is the rate of return that investors would earn if they invested the same amount of the project in a market (value-neutral) portfolio replicating the project's cash flows (from time 1 to time n). The replicating portfolio's return is r_tV_{t-1}. In total, the firm would earn a total income $I^V=\sum_{t=1}^{n}r_tV_{t-1}$. This means that the firm invests $C=\sum_{t=0}^{n}C_t$ at the average ROI, i, while foregoing the opportunity of investing the same total amount at the rate ρ such that

$$\rho=\frac{I^V}{C}.$$

Such a foregone rate is the MARR. It is easy to verify that $I-I^V=$ NPV; therefore,

$$\text{NPV}=\overbrace{C}^{\text{Project Scale}}\cdot\overbrace{(i-\rho)}^{\text{Economic Efficiency}} \tag{4}$$

(see Magni 2019), which represents an economically significant decomposition of NPV: The economic value created depends on the product between the amount of invested capital (project scale) and the extent by which the project rate of return will exceed the MARR (economic efficiency). The following decision criterion is naturally derived.

Decision criterion. A project is worth undertaking if and only if the average ROI is greater than the MARR, $i>\rho$.

3. SOLAR PhV PLANT

In this section, we describe the economic system of a replacement project whereby the conventional retail energy supply is replaced with a renewable energy plant. In particular, we consider the case of a firm currently purchasing electric power from a utility. It faces the opportunity of entering into an *m*-year leasing contract for operating a standalone solar photovoltaic (PhV) system.

Suppose the quantity of energy consumed for the firm's operations is constant through time and equal to *q*; the current purchase price of energy is p_1, growing at a constant rate g_{p_1} per year. The utility bill is payed periodically, in the same year in which energy is consumed.

The leasing contract contains the following economic conditions: The lease payment, equal to L, is made periodically; at time m (expiration date) the firm may acquire the plant paying a lump sum equal to CapEx, and the system will keep producing electric power for some years, until time n. CapEx represents a capital expenditure, with an assumed straight-line depreciation from $t=m+1$ until $t=n$ equal to Dep $=$ CapEx$/(n-m)$.

The PhV plant is installed at $t=0$ in a field owned by the firm, which could otherwise be rented on the property market at a costant rent equal to R per year. The latter represents an opportunity cost for the firm (a foregone income).

The PhV system produces Q units of energy in the first year, which decreases every year at the rate g_Q. If the energy produced by the plant is higher than the energy consumed by the firm, the firm sells the differential quantity to the Energy Service Operator at the energy selling price p_2, growing at a constant rate g_{p_2} per year, with payment in the following year. We assume that, at time $t=n$, the energy sold is paid immediately. Therefore, if the produced quantity is lower than the consumed energy in year t, that is, $Q\left(1-g_Q\right)^{t-1}<q$, energy costs savings arise equal to $Q\left(1-g_Q\right)^{t-1}\cdot p_1\left(1+g_{p_1}\right)^t$; if the produced quantity is higher than the consumed one, that is, $Q\left(1-g_Q\right)^{t-1}>q$, energy costs savings arise equal to $q\cdot p_1\left(1+g_{p_1}\right)^t$ as well as energy sales revenues equal to $\left(Q\left(1-g_Q\right)^{t-1}-q\right)\cdot p_2\left(1+g_{p_2}\right)^t$, determining the presence of operating working capital. Hence, the income effect of the energy sales revenues and costs savings in the two different scenarios can be summarized with the expression

$$\min\left(q\,,Q\left(1-g_Q\right)^{t-1}\right)\cdot p_1\left(1+g_{p_1}\right)^t+\max\left(0\,,Q\left(1-g_Q\right)^{t-1}-q\right)\cdot p_2\left(1+g_{p_2}\right)^t$$

and the operating working capital can be represented with the formula $\text{WC}_t=\max\left(0,Q\left(1-g_Q\right)^{t-1}-q\right)\cdot p_2\left(1+g_{p_2}\right)^t$ and $WC_n=0$.

Starting from year $M < m$, the PhV plant requires operating and maintenance costs which are expected to be constant and equal to O&M. At time n, the plant is removed with disposal costs equal to H and salvage value equal to zero.

In summary, the firm-without-the-project pays the utility bills and receives the rent for the land (for the whole period); in contrast, the firm-with-the-project sustains the lease payments (until $t = m$), the operating and maintenance costs (from $t = M$ to $t = n$), the lump sum (in $t = m$), and the disposal costs (in $t = n$), and receives payments for the energy sold to the Energy Service Operator. Considering that a project represents, by definition, the difference between the firm-with-the-project and the firm-without-the-project, the project's incomes may be calculated as in (1):

- $I_t = \left(\min\left(q\,,\ Q(1-\ g_Q)^{t-1}\right)\cdot p_1(1+g_{p_1})^t + \max\left(0\,,\ Q(1-\ g_Q)^{t-1} - q\right)\cdot p_2(1+g_{p_2})^t - L - R + I_t^l\right)(1-\tau) + \tau I_t^d$
  for $1 \le t \le M-1$
- $I_t = \left(\min\left(q\,,\ Q(1-\ g_Q)^{t-1}\right)\cdot p_1(1+g_{p_1})^t + \max\left(0\,,\ Q(1-\ g_Q)^{t-1} - q\right)\cdot p_2(1+g_{p_2})^t - L - R - \mathrm{O\&M} + I_t^l\right)(1-\tau) + \tau I_t^d$
  for $M \le t \le m$
- $I_t = \left(\min\left(q\,,\ Q(1-\ g_Q)^{t-1}\right)\cdot p_1(1+g_{p_1})^t + \max\left(0\,,\ Q(1-\ g_Q)^{t-1} - q\right)\cdot p_2(1+g_{p_2})^t - R - \mathrm{Dep} + I_t^l\right)(1-\tau) + \tau I_t^d$
  for $m+1 \le t \le n-1$
- $I_t = \left(\min\left(q\,,\ Q(1-\ g_Q)^{t-1}\right)\cdot p_1(1+g_{p_1})^t + \max\left(0\,,\ Q(1-\ g_Q)^{t-1} - q\right)\cdot p_2(1+g_{p_2})^t - R - \mathrm{Dep} - H + I_t^l\right)(1-\tau) + \tau I_t^d$
  for $t = n$.

The project's assets are represented by working capital, liquid assets and, from time m, fixed assets:

- $C_t = \max\left(0, Q(1-\ g_Q)^{t-1} - q\right)\cdot p_2(1+g_{p_2})^t + C_t^l$
  for $1 \le t \le m-1$
- $C_t = \max\left(0, Q(1-\ g_Q)^{t-1} - q\right)\cdot p_2(1+g_{p_2})^t + \mathrm{CapEx} - \mathrm{Dep}\cdot(t-\ m) + C_t^l$
  for $m \le t \le n-1$
- $C_t = 0$
  for $t = n$.

Finally, the cash flows are obtained as $F_t = I_t - \Delta C_t, \forall t = 0,1,\dots,n.$

We assume that the project is financed with internal financing, that is, with retained cash. This implies, $C_t^d = I_t^d = F_t^d = 0\ \forall\, t = 0,1,\dots,n$ and $C_t = C_t^e,\ I_t = I_t^e,\ F_t = F_t^e$ for all t. The rate of return on liquid assets is constant and equal to i^l, hence $I_t^l = i^l \cdot C_{t-1}^l$. The assumption of zero debt means that, whenever the operating cash flows is negative, $F_t^o < 0$, the operating disbursement is covered by absorbing resources from the liquid assets, that is, $F_t^l = -F_t^o > 0$, therefore, implying that the project's cash flow is zero, $F_t = 0$. In contrast, when the operating cash flow is positive, $F_t^o > 0$, the distribution policy is the following:

- Until $t = m$, cash is retained and invested in liquid assets
- From $t = m+1$, the positive operating cash flow is fully distributed to equityholders within the period, $F_t^e = F_t^o = F_t > 0$.

A time n, the project is terminated, such that every asset and liabity goes back to zero.

We assess the economic profitability and value creation of the replacement project via the average ROI and the NPV, and show that the IRR notion fatally collapses under the assumption of internal financing. We assume that the costs of capital of operating assets and liquid assets are constant through time, equal to r^o and r^l respectively.

Assuming that the project's terminal cash flow is nonnegative, $F_n \ge 0$, it is easy to see that the assumption of internal financing implies that the project's cash-flow stream is nonnegative, that is, $F_t \ge 0$ for all t. Therefore, $\mathrm{NPV} \ge 0$, which implies that the analyzed replacement project is worth undertaking. However, the equation $\mathrm{NPV} = 0$ has no solution and the IRR does not exist. In contrast, the average ROI exists and is unique, with unambiguous financial nature determined by the sign of the total capital. The NPV may be decomposed into project scale (i.e., total capital), and economic efficiency (difference between average ROI and MARR).

4. NUMERICAL EXAMPLE

Consider a replacement project with the following input data:

- Energy purchase price = Energy selling price: $p_1 = p_2 = 0.1$ (€/kWh)
- Growth rate of energy-purchase-price = Growth rate of energy-selling-price: $g_{p_1} = g_{p_2} = 1.5\%$
- Yearly consumed energy: $q = 800{,}000$ kWh
- Rent of the land property: $R =$ €$10{,}000$
- Length of the leasing contract: $m = 20$ years
- Lease payment: $L =$ €$40{,}000$
- Capital expenditure CapEx = €$150{,}000$
- Energy produced by PhV plant in the first year: $Q = 1{,}000{,}000$ kWh
- Efficiency loss per year: $g_Q = 3\%$
- Useful life of PhV plant: n =30 years
- Maintenance costs: O&M = €$1{,}000$
- Starting of O&M operations: M =11-th year
- Disposal costs: $H =$ €$30{,}000$
- Tax rate: $\tau = 25\%$
- Interest rate on liquid assets = Cost of capital for liquid assets: $i^l = r^l = 4\%$
- Cost of capital for operating assets: $r^o = 12\%$

These data are used to determine the income statements, balance sheets, and financial prospects.

To sum up the results: The substitution of the retail energy system with the PhV plant creates value for equityholders, since NPV $= 215{,}027.22 > 0$. The cash-flow stream of the project and equity coincides and is non-negative, with some positive cash flows. In particular, the project's cash flow is zero in the first 20 years, then it is positive up to (and including) the last year. As anticipated, this implies that the project IRR does not exist. The use of the average ROI overcomes the problem of non-existence of IRR. The total capital invested in the project is $C = C^e = 15{,}132{,}751.7 > 0$, and, therefore, the project is an investment, and the average ROI (equal to the average ROE) is $i = i^e = 8.35\%$, and the MARR is $\rho = \rho^e = 6.93\%$. The economic efficiency is $8.35\% - 6.93\% = 1.42\%$, which, multiplied by the total capital $C = 15{,}132{,}751.7$, gives back the NPV$= 215{,}027.22$. The investors invest an overall capital of €15,132,751.70 at a 8.35% rate of return, which is higher than the MARR by 1.42 percentage points.

It is worth noting that it is not even possible to calculate the IRR of the operating cash-flow stream, notwithstanding the fact that it does change sign. The reason is that it changes sign twice, from positive to negative and then positive again, and the magnitudes of the changes are such that no real-valued IRR exists. In contrast, the IARR approach enables computing the *operating* average ROI ratio by dividing the net operating cash flow (i.e., the algebraic sum of the operating cash flows), $\sum_{t=0}^{30} F_t^o = 694{,}377.03$, by the total operating assets, $C^o = 908{,}424.11$. The result is $i^o = \frac{694{,}377.03}{908{,}424.11} = 76.44\%$. The project's average ROI is the weighted mean of the operating average ROI and the interest rate on liquid assets, where the weights are the total operating assets and the total liquid assets:

$$i = \frac{\overbrace{76.44\%}^{i^o} \cdot \overbrace{908{,}424.11}^{C^o} + \overbrace{4\%}^{i^l} \cdot \overbrace{14{,}224{,}327.59}^{C^l}}{908{,}424.11 + 14{,}224{,}327.59} = 8.35\%.$$

5. CONCLUSIONS

We have provided an accounting-and-finance model capable of correctly describing the economic transactions underlying the replacement project and we have offered a logically-consistent system for supporting the investment appraisal and the decision-making process. Specifically, we have shown that the Internal Rate of Return (IRR) is not reliable, in general, since the lease+purchase of the PhV may generate nonconventional patterns of cash-flow streams such that no change in sign occurs, which implies that the IRR does not exist. We have shown that the IARR approach and, in particular, the average ROI, provides a simple rate of return, naturally linked with NPV. The NPV is broken down into project scale (overall capital invested) and economic efficiency (difference between average ROI and MARR).

REFERENCES

Brealey RA, Myers S, Allen F 2011. *Principles of Corporate Finance*, global ed., McGraw-Hill Irwin, Singapore.

Graham, JR, Harvey CR 2001. The theory and practice of corporate finance: Evidence from the field. *Journal of Financial Economics*, 60, 187–243.

Magni CA 2011. Aggregate return on investment and investment decisions: A cash-flow perspective. *Engineering Economist*, 56 (2), 181–182.

Magni CA 2019 (forthcoming). *Investment Decisions and the Logic of Valuation. Linking Finance, Accounting, and Engineering.* Springer Nature, Switzerland.

Magni CA, Marchioni A 2018. Project appraisal and the Intrinsic Rate of Return. *Proceeding of 4th International Conference on Production Economics and Project Evaluation, ICOPEV,* Guimaraes, Portugal, September 20-21, 225-230.

Remer DS, Stokdyk SB, VanDriel M 1993. Survey of project evaluation techniques currently used in industry. *International Journal of Production Economics*, 32, 103–115.

Remer DS, Nieto AP 1995a. A compendium and comparison of 25 project evaluation techniques. Part 1: Net present value and rate of return methods. *International Journal of Production Economics*, 42, 79–96.

Remer DS, Nieto AP 1995b. A compendium and comparison of 25 project evaluation techniques. Part 2: Ratio, payback, and accounting methods. *International Journal of Production Economics*, 42, 101–129.

Ross SA, Westerfield RW, Jordan BD, 2011. *Essentials of Corporate Finance*, seventh ed. McGraw-Hill/Irwin, New York.

Ryan PA, Ryan GP, 2002. Capital budgeting practice of the Fortune 2000: How have things changed? *Journal of Business Management*, 8 (4), 355–364. (Fall).