Innovations in investment evaluation methodology – MIRR method and its improvements

Sanjin Ivanović*, Ph.D., Associate Professor

Zorica Vasiljević*, Ph.D., Full Professor

Saša Todorović*, M.Sc., Teaching Assistant

*Faculty of Agriculture, Belgrade University, Serbia

- **There are two commonly used methods for evaluation of investments:**
  - Net Present Value (NPV)
  - Internal Rate of Return (IRR).

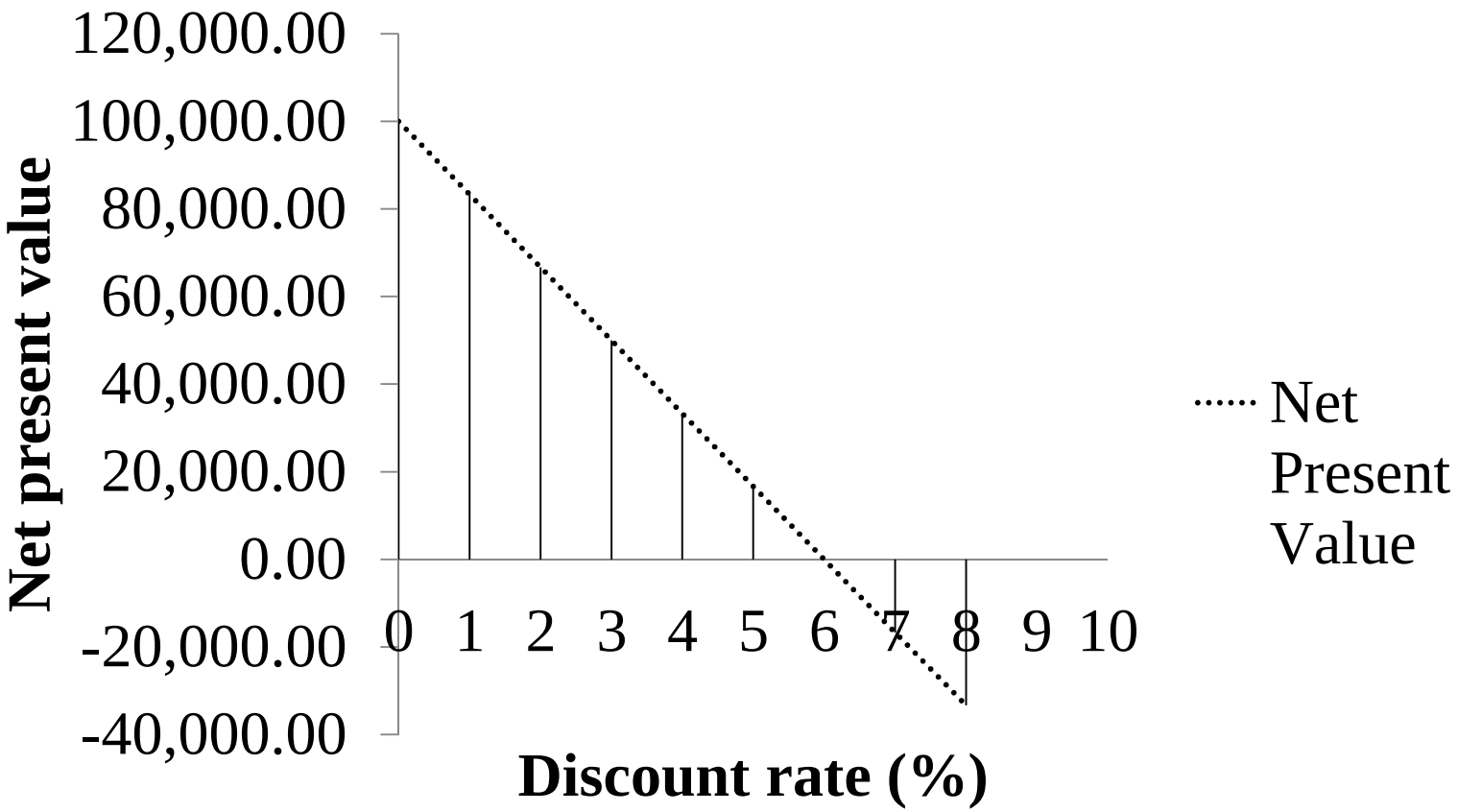
- **Both methods are based on:**
  - Net cash flows from investment,
  - Time value of money.

- NPV is the most important method of investment evaluation.
- It is the absolute indicator – if NPV is > 0 an investment is economically profitable.

- IRR is expressed in percents.
- IRR shows actual interest rate of invested assets.

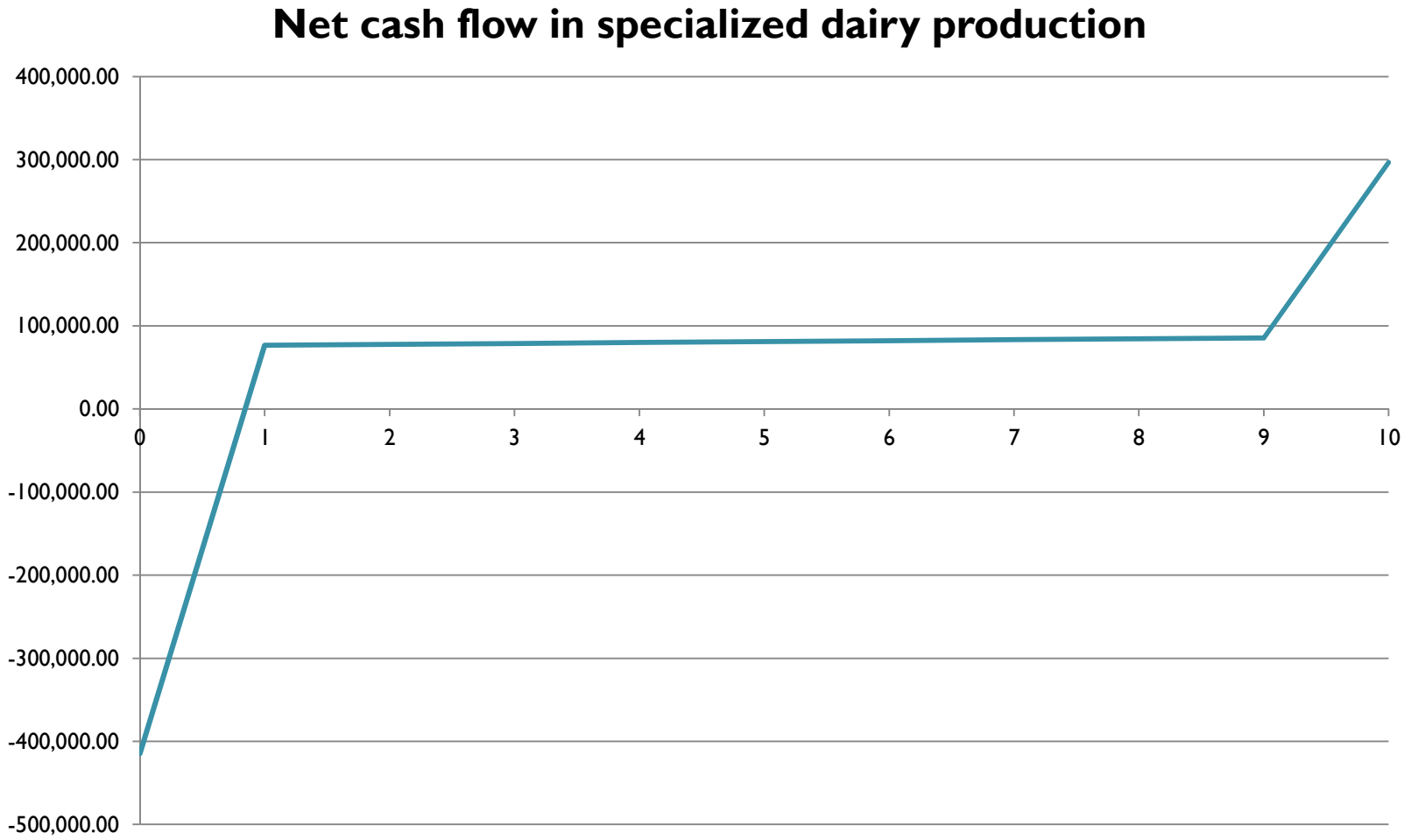
- These two methods are usually combined.

NPV and IRR are connected – IRR is a discount rate where NPV of investment equals zero.

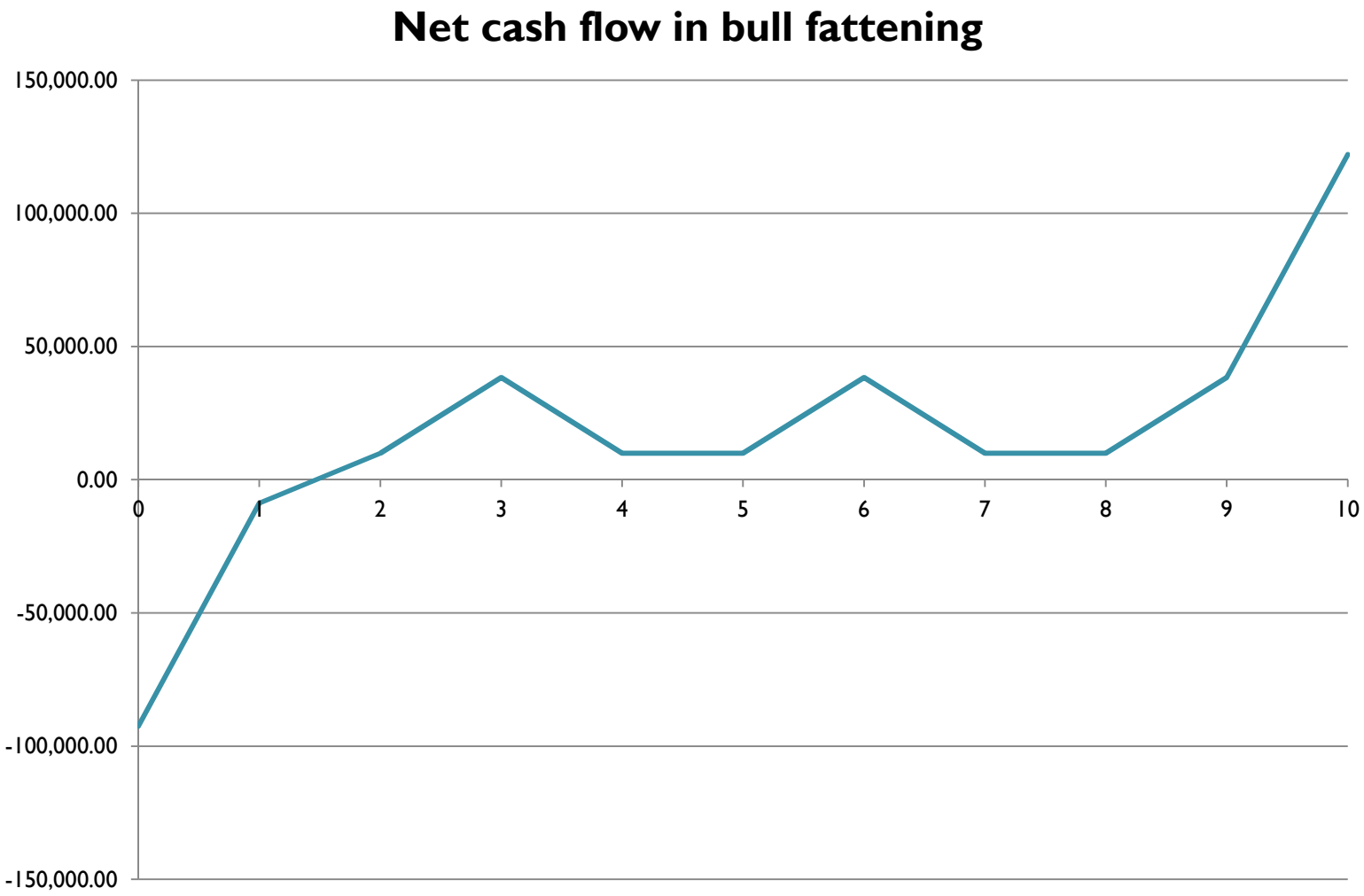


- **In reality NPV is used more often than IRR method.**
- **IRR method has its disadvantages related to fluctuation of NCF!!!**

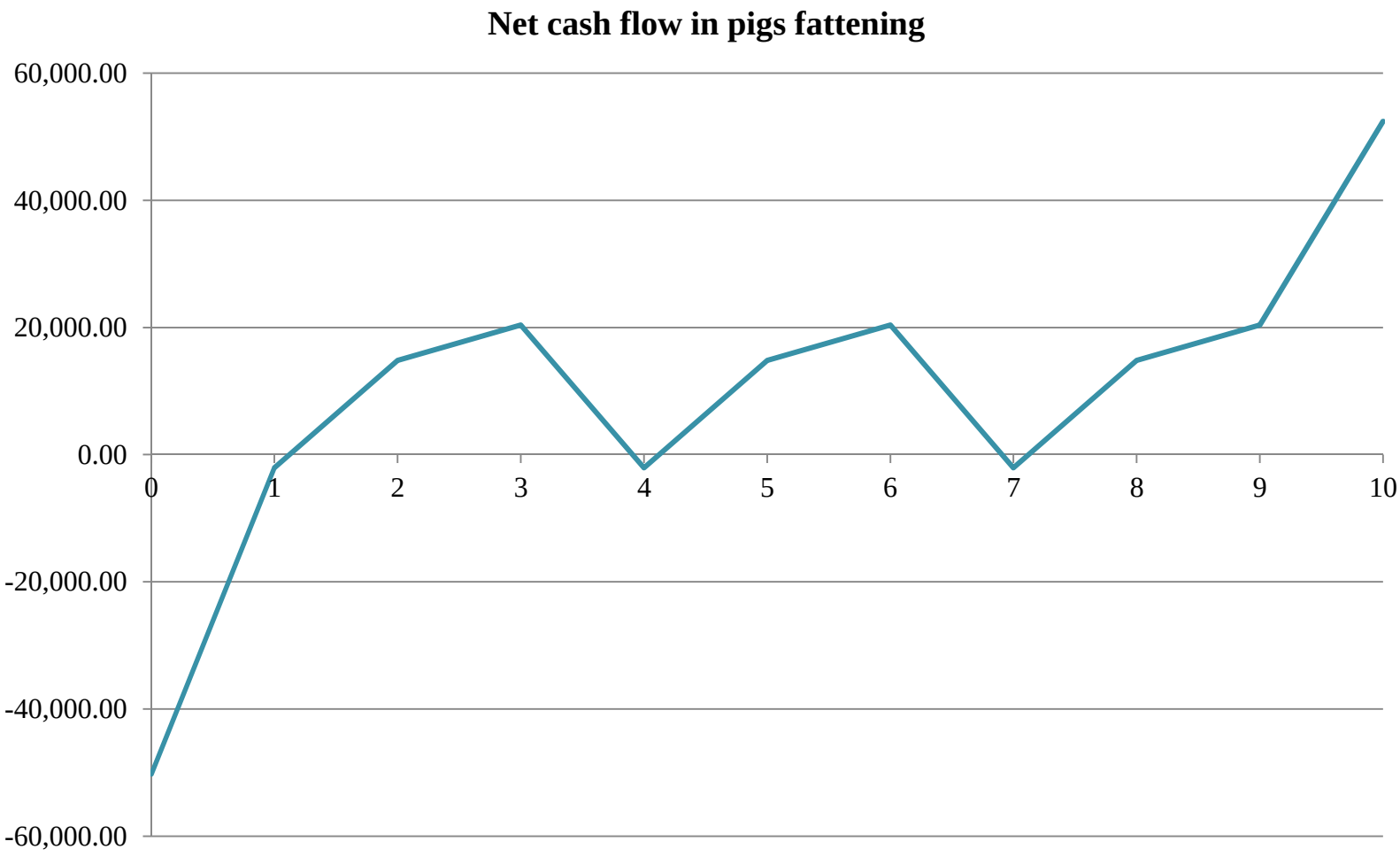
Normal cash flow (one initial cash outflow and later constant positive cash flows).



IRR cannot be used if net cash flow is negative more than once.



IRR cannot be used if net cash flow frequently changes from positive to negative.



- Modified Internal Rate of Return (MIRR):

- Solves the problem of multiple IRRs,
- Solves other major imperfection of IRR – unrealistic assumption about the reinvesting rate of net cash flow.

- It is needed to pedagogically emphasize the superiority of the MIRR decision rules!

- MIRR method is almost ignored in significant and highly respected textbooks, and usually avoided by executives Kierulff (2008).
- In the 15 significant and highly respected finance textbooks (reviewed by Kierulff) nearly all either ignored MIRR or gave it little space.
- None explored the full potential of the method, although some noted its superiority over IRR.

- It is considered difficult to understand and compute.

- The Ryan P. (2002) study of Fortune 1000 indicates that for decades IRR has been preferred over NPV method.
- MIRR is not popular.

- In the Burns and Walker (1997) study of the Fortune 500, MIRR was used only 3% of the time, although advantages of this methods are known.

- In Serbia this method is rarely used in scientific papers as well as in practice.
- Employees of Agricultural Extension Service do not receive training on this methodology.

Example of pigs fattening in Serbia

Cost of capital	Modified internal rate of return (MIRR)	Net present value (NPV)
4%	11.43%	50,782.35
8%	13.08%	29,320.79
12%	14.80%	13,901.35
16%	16.60%	2,594.07
17%	17.06%	251.55
18%	17.52%	-1,929.54

Improvements of MIRR method

- Primarily related to rankings of mutually exclusive projects – NPV and MIRR conflict.
- Adjustments for scale and time span differences.
- Issues related to cost of capital and uncertainty.

Conclusions

- MIRR has many advantages over IRR.
- Disadvantages
  - It is more complicated to calculate than IRR,
  - Sometimes results are opposite to NPV.
- It is needed to pedagogically emphasize the superiority of the MIRR decision rules.
- It is expected that MIRR will be more accepted.
- From a cognitive point of view more natural for managers to use percentages (MIRR) than amount of money (NPV).

Thank you for your attention!