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An Austrian View on Risk and Its Quantification: A Reply to Hering, Olbrich, and Rapp

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Abstract: Hering, Olbrich, and Rapp (2021) pointed out limitations to the risk-adjusted method proposed in Kruk (2020) and advised using scenario analysis as an alternative. Based on their reply, some additional improvements of the method can be proposed, such as using the time-dependent discount rate. Business practitioners value the simplicity of the risk-adjusted net present value method. As a result, scenario analysis is not a viable solution to the problem of calculating investment profitability because business practitioners value the simplicity of other calculation methods.

The Austrian business cycle theory (ABCT) emphasizes the key role of the interest rate and the negative consequences of artificially lowering it below the market rate. Joanna Kruk (2020) presented the downsides of using the net present value (NPV) to rank investments without adjusting the NPV for the risk of an interest rate increase. The NPV favors longer-term investments, which consume more capital. To avoid further mistakes in the decision-making process leading to malinvestments, Kruk (2020) presented a model that incorporated the Macaulay duration into the capital asset pricing model (CAPM) equation to create a risk-adjusted interest rate.

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In their rejoinder to Kruk (2020), Thomas Hering, Michael Olbrich, and David J. Rapp (2021) described limitations of NPV and duration measures. They also pointed out that the CAPM was not designed to support entrepreneurial decision-making, even though it has been used by practitioners. At the end of their response, Hering, Olbrich, and Rapp proposed an alternative method for investment appraisal—scenario analysis.

CAPM, DURATION, AND NPV

The aim of Kruk (2020) was to present the potential influence of lowering the interest rate on investments. Entrepreneurs may select various corrective methods and actions. One of the methods presented in Kruk (2020) was to link the duration and NPV to the concept of CAPM to create a risk-adjusted NPV method.

Hering, Olbrich, and Rapp (2021) pointed out that the duration suffers from the unrealistic assumption of a steady interest rate (both before and after interest rate changes) in all periods. The error stemming from this assumption becomes more significant as the investment horizon and uncertainty increase. A steady interest rate was used for the purpose of simplicity. However, in the duration equation, the interest rate r can be easily substituted with r_t, where the interest rate is different for each period t. In this way, a change in the value of the interest rate can be incorporated.

Potential investments are ranked based on their profitability, and NPV can be used to rank their profitability. As pointed out by Hering, Olbrich, and Rapp (2021), Kruk's assumption about decreasing the NPV's curve is not always true. However, those authors failed to notice two factors. Firstly, as described by Cwik (2008), when the interest rate drops, there is an incentive for entrepreneurs to invest more in fixed rather than working capital. The characteristics of fixed capital investment are a long investment horizon and large expenditure at the beginning of the investment. Due to the form of the NPV equation, in these cases, a nondecreasing NPV shape is highly unlikely.

Secondly, the NPV is not supposed to be used in the context of a single project. Its purpose is to rank projects based on their profitability. Therefore, using NPV is sensible only as a measure

of relative profitability. The nondecreasing NPV curve does not in any way preclude using the risk-adjusted NPV method, but rather informs the investor about the possible rise in an investment's value after an interest rate increase. If we include the additional agio, which accounts for potential upward movement in the initial interest rate, then the project in the selected example becomes more profitable because it is associated with large cash inflows near the beginning of the investment.

Moreover, Hering, Olbrich, Rapp (2021, 354) suggested that using ex post information, as in the CAPM method, is "entirely pointless for decision-making purposes from an ex ante perspective." However, they failed to take into account that ex post information still conveys some knowledge about the current and potential future market states. This can be easily illustrated with an example of two scenarios for particular entrepreneurs. In one scenario, the entrepreneur possesses the ex post information, whereas in the second, he has limited knowledge or no knowledge at all. Entrepreneurs who know the past market condition should be systematically more successful than the ones with no knowledge at all. Moreover, the entrepreneur's ex post knowledge is essential to the concept of learning and acquiring new knowledge because they can also learn from the recorded observation of the results of his past action (Rothbard 2009). Moreover, "the price system also provides ex-post knowledge to economic actors in the form of the constellation of prices that emerge in the next period and the profit and loss statements of business" (Boettke and Sautet 2011, 36).

DISADVANTAGES OF SCENARIO ANALYSIS METHOD

Instead of the risk-adjusted NPV method presented by Kruk (2020), Hering, Olbrich, and Rapp (2021) recommended using scenario analysis to reveal the range of uncertain future states imagined by the entrepreneur. Those authors suggested using the Monte Carlo method, whereby multiple scenarios can be generated by accounting for every possible value that each variable could take and weighting each possible scenario by the probability of its occurrence. This can be achieved by modeling each variable within a model using a probability distribution (Vose 2008). There

are several limitations to this method. Monte Carlo simulation is a powerful tool, but the resulting models will only be as good as the information and distributions used to create them. Monte Carlo simulations tend to show very wide distributions because each simulated scenario is generated unintelligently and no management influence is incorporated. In reality, if the investment will generate additional costs, some corrective action will be taken by the management. Thus, the long-term project paths generated by the Monte Carlo method may not be reliable.

Moreover, the Monte Carlo method has not been widely used by project managers because it was "perceived as a burden rather than a benefit to the organization when . . . implemented heavily" (Kwak and Ingall 2007, 46). This implies that managers may prefer a simple method giving less accurate estimates but offering ease of use and calibration to more sophisticated statistical methods.

The main point of Kruk (2020) was to emphasize that the market interest rate, which is controlled by the central bank, is abnormally low and that entrepreneurs must take this into account when choosing which investment to pursue. Simulating NPV trends under different scenarios does not address this issue. Although uncertainty is an immanent aspect of entrepreneurship and the market, management decisions often attempt to quantify entrepreneurial intuition. ABCT is built around the impact of the artificial interest rate and how a low interest rate creates a false impression about the availability of resources needed to finish the project. Thus, research should focus on how to prevent entrepreneurs from overestimating the impact of falling interest rates because this could cause further market disturbances, such as high debt accumulation and excessive long-term investment in fixed capital, which is sensitive to rate changes.

Even though there are limitations to combining the duration, NPV, and CAPM, this does not mean that such an effort cannot give some approximation of reality. There is no doubt that because interest rates are currently below market, an agio must be used to adjust them in order to receive more accurate information regarding the availability of resources and make better investment choices. The risk-adjusted NPV is just an example, but the matter should be further researched. Thus, the question is whether the risk-adjusted NPV gives better information about the real interest rate and

resource availability than the unadjusted interest rate in terms of the risk of rate changes. As highlighted by Kruk (2020), not adjusting the interest rate in a low-rate environment leads entrepreneurs to engage in longer-term investment projects that cannot be finished due to resource availability. The Monte Carlo scenario method does not further address this issue.

CONCLUSION

Hering, Olbrich, and Rapp (2021) raised some valid concerns about the approach taken in Kruk (2020). However, it was never the purpose of Kruk (2020) to establish the perfect approach to quantifying the interest rate risk in investment project valuation, but rather to underline the need to use proper discount factors in evaluating investments. Kruk (2020) herself noted some of the limitations of her method. Hering, Olbrich, and Rapp (2021) named a few others, listing several simplifications in the assumptions of this method, none of which, however, seems to disqualify using it. As explained previously, practitioners value simplicity in a method to be used. Hering, Olbrich, and Rapp (2021) proposed scenario analysis as a more desirable for capturing the entrepreneurial imagination and future states of uncertainty. However, this approach is far more demanding to use and suffers from the several limitations discussed. The future research should focus on methods which could help to prevent malinvestment, driven by artificially lowering interest rate by central bank. The risk-adjusted NPV method is one step in this direction and can be used for that purpose.

REFERENCES

Boettke, Peter J., and Frédéric Sautet. 2011. "The Genius of Mises and the Brilliance of Kirzner." GMU Working Paper in Economics 11–05, February 1, 2011. https://www.mercatus.org/hayekprogram/research/working-papers/genius-mises-and-brilliance-kirzner.

Cwik, Paul F. 2008. "Austrian Business Cycle Theory: A Corporate Finance Point of View." *Quarterly Journal of Austrian Economics* 11, no. 1 (March): 60–68.

Hering, Thomas, Michael Olbrich, and David J. Rapp. 2021. "Net Present Value, Duration, and CAPM in Light of Investment Theory: A Comment on Kruk." *Quarterly Journal of Austrian Economics* 24, no. 2 (Summer): 348–59.

Knight, Frank H. 1921. *Risk, Uncertainty, and Profit*. Boston: Houghton Mifflin.

Kruk, Joanna. 2020. "Corporate Risk Evaluation in the Context of Austrian Business Cycle Theory." *Quarterly Journal of Austrian Economics* 23, no. 2 (Summer): 131–51.

Kwak, Young H., and Lisa Ingall. 2007. "Exploring Monte Carlo Simulation Applications for Project Management." *Risk Management* 9, no. 1 (February): 44–57.

Rapp, David J., and Michael Olbrich. 2021. "On Predictive Entrepreneurial Action in Uncertain, Ill-Structured Conditions." *Review of Managerial Science* 15, no. 7 (May): 1961–79.

Rothbard, Murray N. 2009. *Man, Economy, and State with Power and Market*. 2nd scholar's ed. Auburn, Ala.: Ludwig von Mises Institute. First published in 1962 and 1970.

Vose, David. 2008. *Risk Analysis: A Quantitative Guide*. Chichester, U.K.: John Wiley and Sons.