

Putting country risk front and center in corporate strategy and investment decisions

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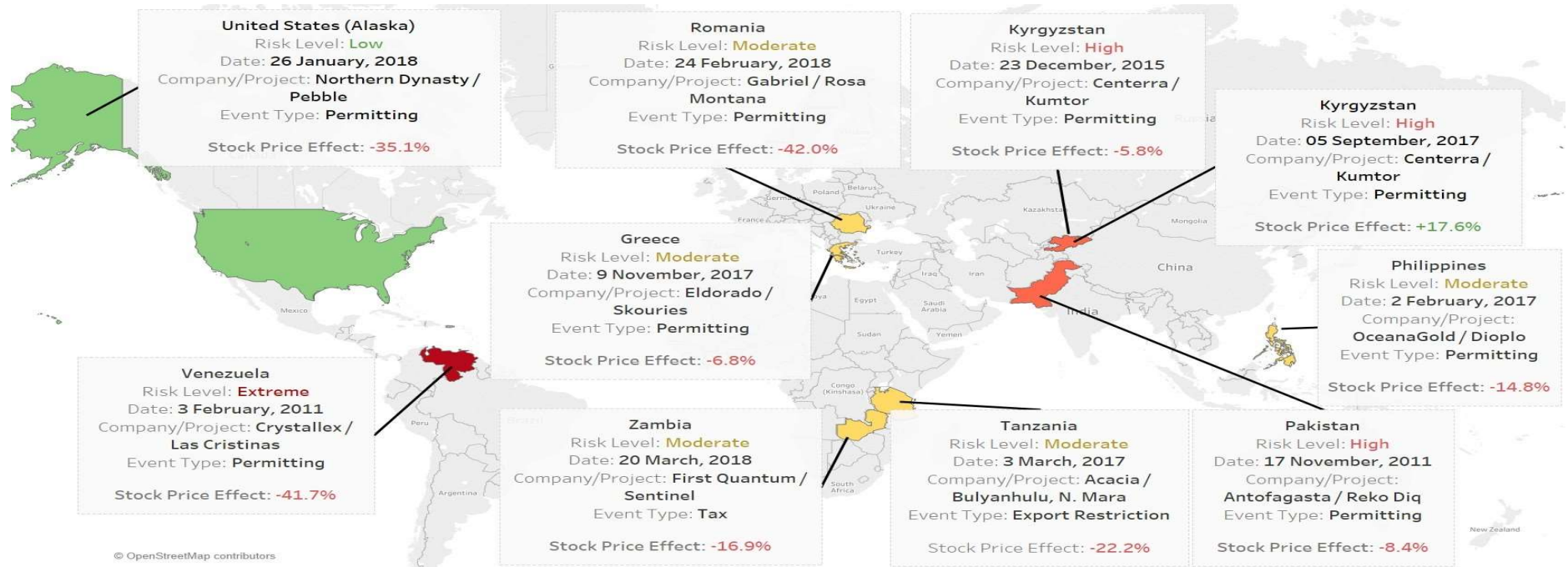
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Country risk —

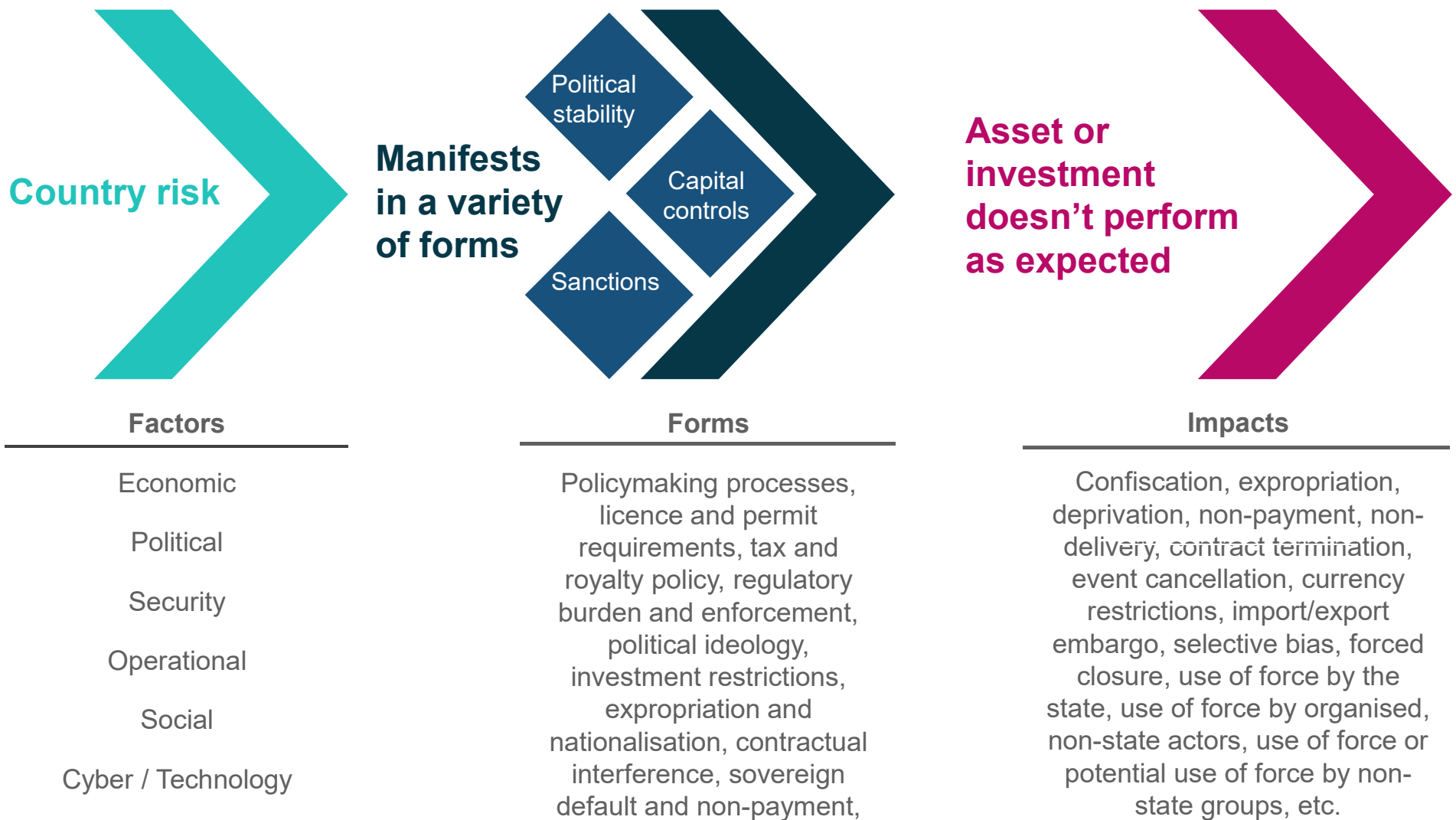
Country risk examples in the mining industry

- ▶ Attractive mineral deposits are distributed through out the world based on geological circumstances.
 - ▶ They are not located according to a country's political stability or the Fraser Institute's Mining Policy Perception Index.
- ▶ Country location creates an additional risk exposure beyond financial and technical that can have a dramatic impact on investment value and return.



Country risk —

Definition of country risk



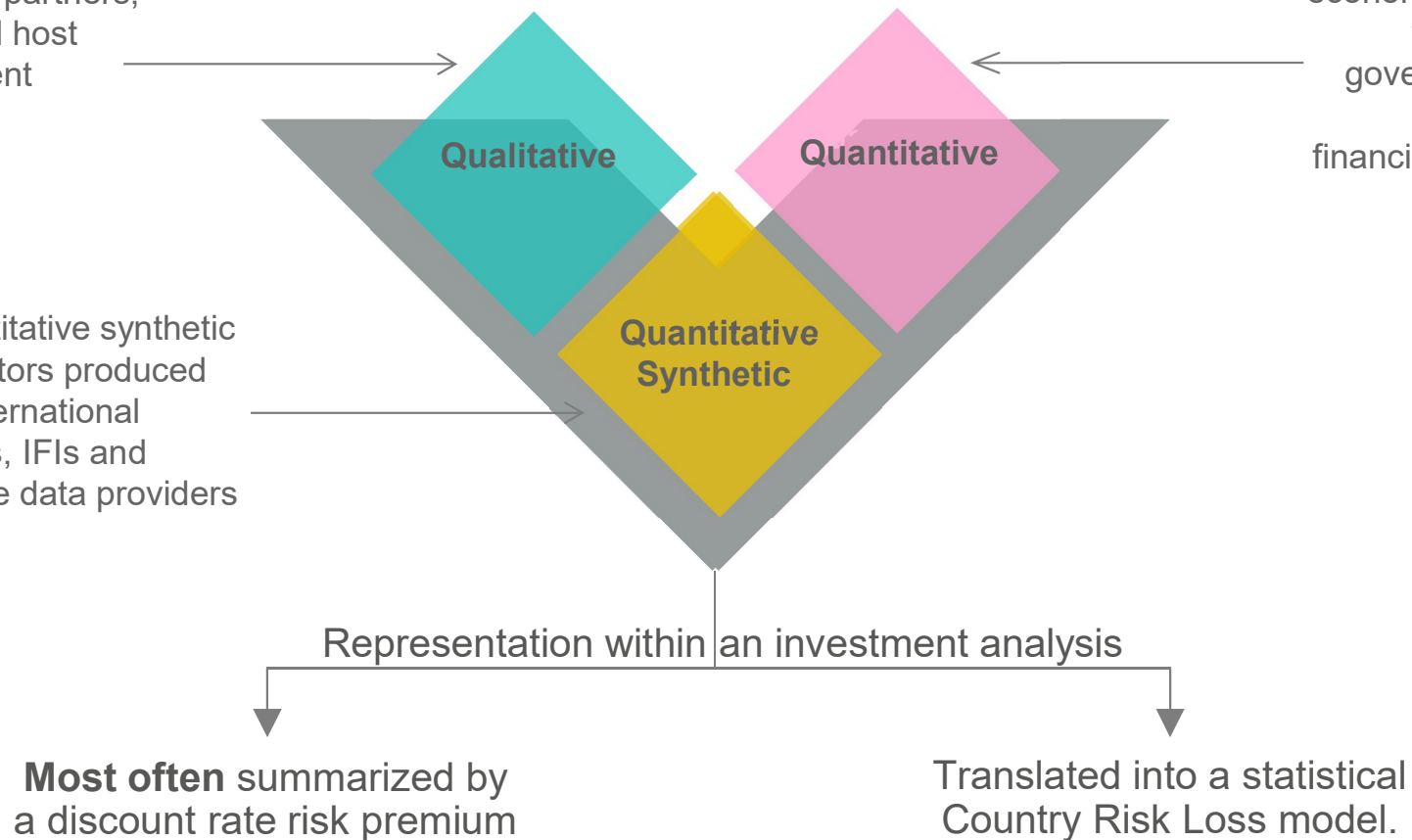
Country risk —

Measuring and quantifying the effects of country risk

Qualitative insights from staff/partners; home and host government agencies

Quantitative economic indicators from national governments and international financial institutions

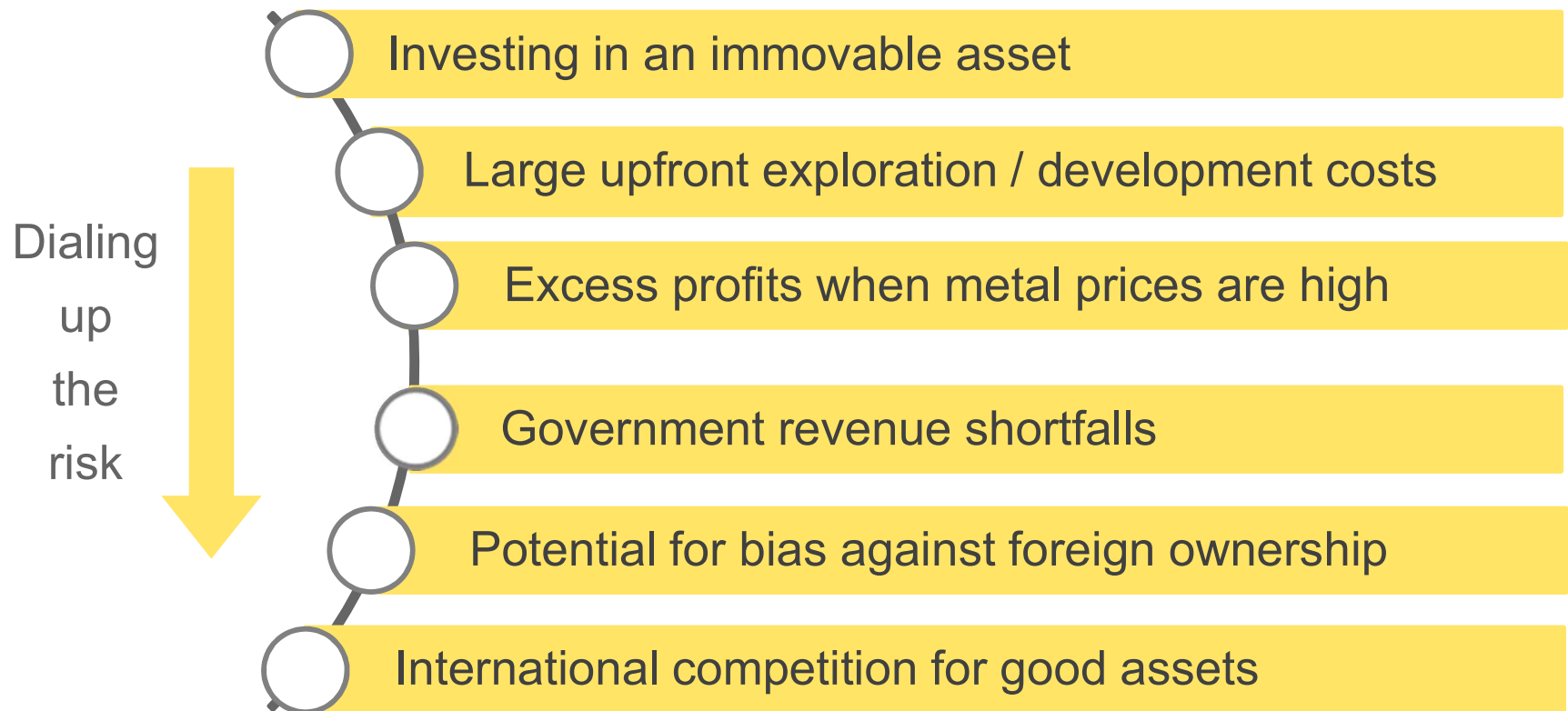
Quantitative synthetic indicators produced by international NGOs, IFIs and private data providers



Country risk —

Mining industry characteristics that create risk exposure

- ▶ The mining industry has a number of characteristics that increase exposure to country risk:

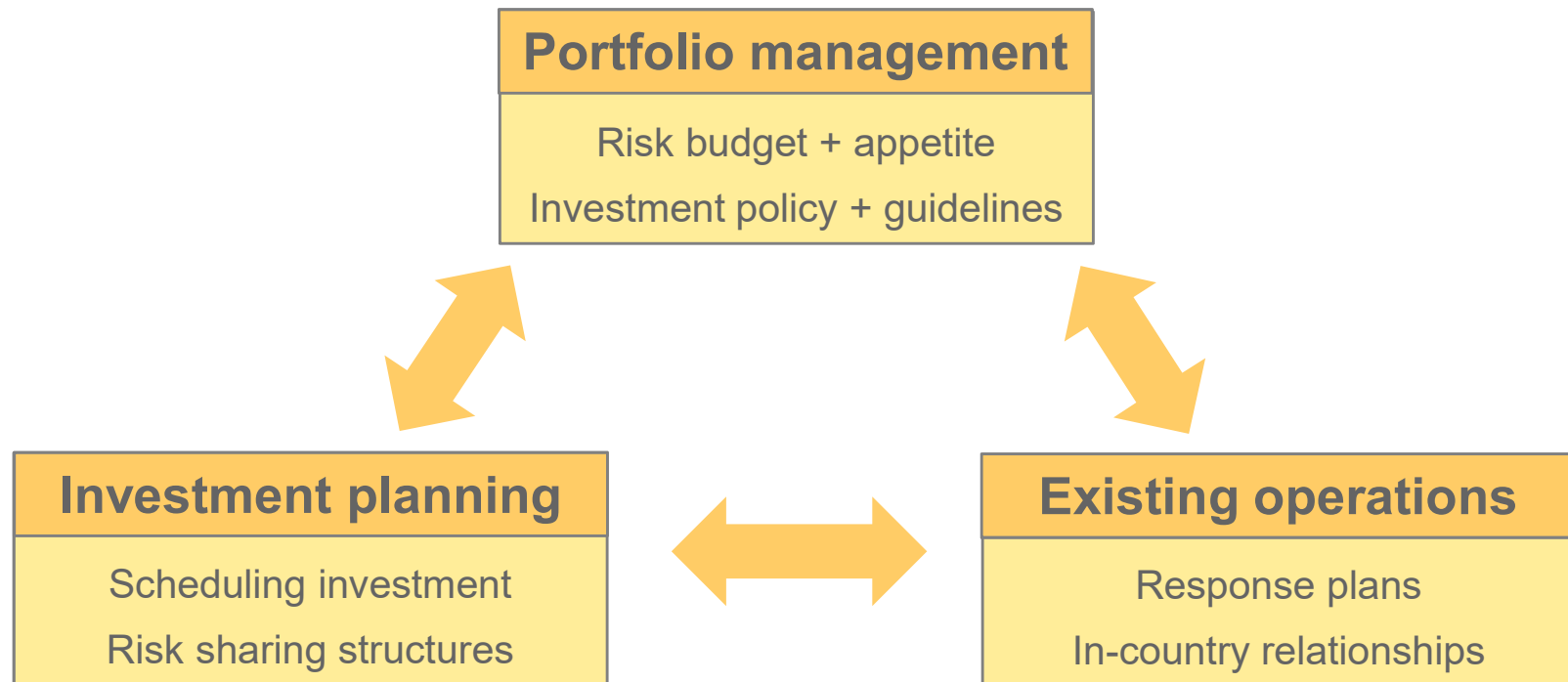


- ▶ How can an organization manage country exposure?

Managing country risk —

Investment, operational, and portfolio focus areas

- ▶ A corporate country risk program has three interrelated focus areas:



- ▶ Prime objectives of a country risk management program are:
 - ▶ Controlling capital risk exposure when first making an investment, and
 - ▶ Protecting shareholder value once an investment is made.

Managing country risk —

Investing planning: Controlling capital risk exposure

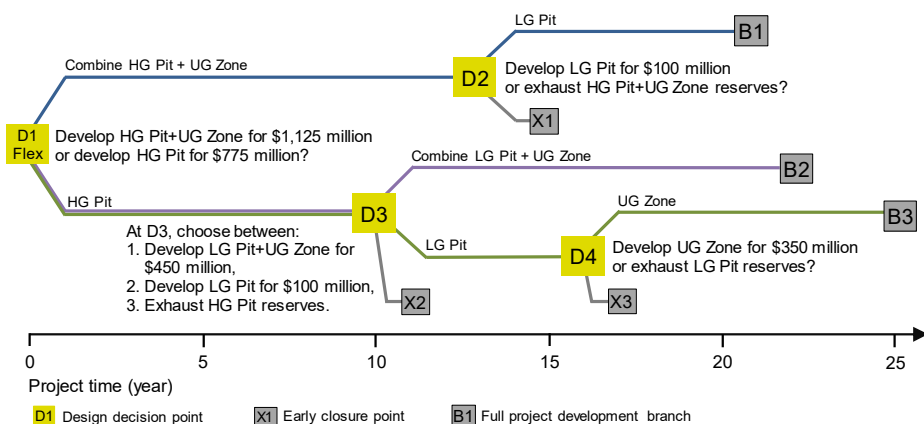
- ▶ When assessing investment opportunities, recognizing and limiting (where possible) the exposure of capital to country risk should be part of the investment acceptance process.

- ▶ Two methods of controlling capital risk exposure:

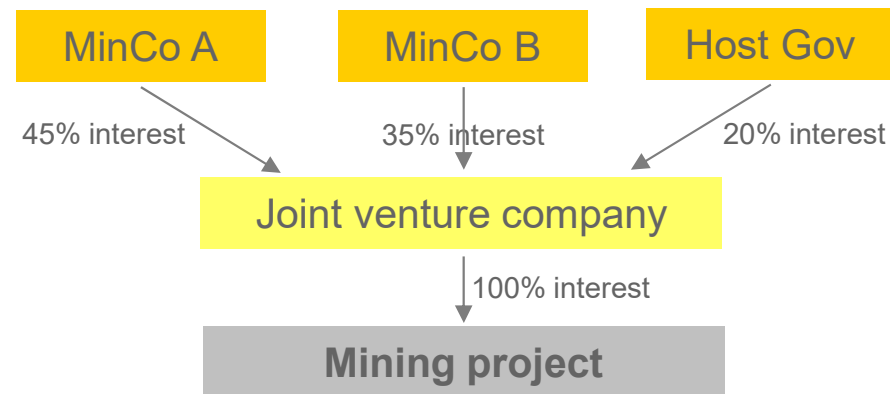
Staged investment: A sequential investment plan reduces upfront investment and allows capital to be committed later if business conditions are favourable.

Risk transfer: Country risk exposure can be shared through joint ventures and alternative financing arrangements such as streaming.

Frontloading vs sequential investment



Risk sharing through a Joint Venture



Managing country risk —

Existing operations: Protecting shareholder value



Managing country risk —

Portfolio management: Align investments with strategy

- ▶ Value, return and risk information is pulled into a corporate portfolio model to analyse corporate efficient risk-return frontier and risk budget considerations.



The unexpected can and does happen — Remedies when things go wrong

- ▶ Actual avenues for restitution are often **limited** when things go wrong even when host country and international law is in your favour.

	Examples		Likely effectiveness
International arbitration	International Centre for the Settlement of Investment Disputes (ICSID), London Chamber of International Arbitration, United Nations Commission on International Trade Law		Limited from an investment perspective; no near-term positive impact on cash-flow.
Utilize deal structure provisions	Bilateral investment treaty (BIT)		As above
Government lobbying	Use of home government (e.g. Canadian influence); engagement across local/state vs. national		Dependent on circumstances. Leverage often limited. Requires sound understanding of stakeholders.
Operational responses	Leverage crisis management approaches, i.e. methodical approach, reducing assumptions and establishing facts.		Dependent on specifics. Largely contingent on pre-event effort.

Modelling country risk as a CRL model —

The country risk premium revisited

- ▶ Country risk is most often recognized in mining investment valuation by increasing an investment's discount rate with an additional risk premium.
 - ▶ A country risk premium is a value effect and not a cash flow effect. It provides little insight into how geographical location affects a project's and company's risk profile
- ▶ Using a country risk premium requires calculating a Country Risk Discount Factor ("CRDF") for each future period. A 1-Year CRDF is:

$$\text{1-Year CRDF} = \frac{1}{1 + \text{CRP}}$$

where:

CRDF = Country risk discount factor. CRP = Country risk premium.

- ▶ A risk premium can be transformed into Country Risk Loss ("CRL") model by recognizing the 1-Year CRDF is equal to two probability-weighted outcomes:

CF if event occurs

CF if no event occurs

$$\text{1-Year CRDF} = \text{ProbE} \cdot (\$1.00 - \text{CFLoss}) + (1 - \text{ProbE}) \cdot \$1.00$$

where:

ProbE = Probability of a political event occurring CFLoss = Cash flow loss from a political event.

Modelling country risk as an CRL model —

The country risk premium revisited

- ▶ With some algebra, we can link the CRL model and the country risk premium through the CRDF such that:

$$\text{ProbE} \cdot \text{CFLoss} = \frac{\text{CRP}}{1 + \text{CRP}}$$

- ▶ This relationship can be further modified such that the actual cash flow loss given a political event is uncertain with the cash flow impact varies between some small positive % and –100%. The revised relationship is:

$$\text{ProbE} \cdot E[\text{CFLoss}] = \frac{\text{CRP}}{1 + \text{CRP}}$$

- ▶ The above relationship allows the CRL model to be tuned so that it returns a 1-Year CRDF equal to the 1-Year risk premium CRDF. This is done by selecting pairs of ProbE and E[CFLoss] such that the above equation holds.
 - ▶ Note that the CRL and risk premium models will have the same value effect when this relationship to holds.

Modelling country risk as an CRL model —

So why is this interesting?

- ▶ The CRL country risk model outlined in this section is not very exciting if mining investments are analysed with a Static CF model since the risk premium approach provides an equivalent result with much less effort.
- ▶ However, the CRL country risk model is more interesting within a dynamic cash flow model because:
 - 1) It has the ability to model country risk as the result of uncertainty related to the timing of a political event (frequency) and the size of cash flow loss (severity).
 - 2) It allows investments in different geographical regions to be compared based on the level of cash flow uncertainty generated by location in addition to value. This is likely important for portfolio analysis at a global mining company.

Example: Mining company portfolio analysis

Portfolio of development and operating projects

Issue:

Mining Co. is reviewing its global asset portfolio to better understand their risk exposure at both project and portfolio levels.

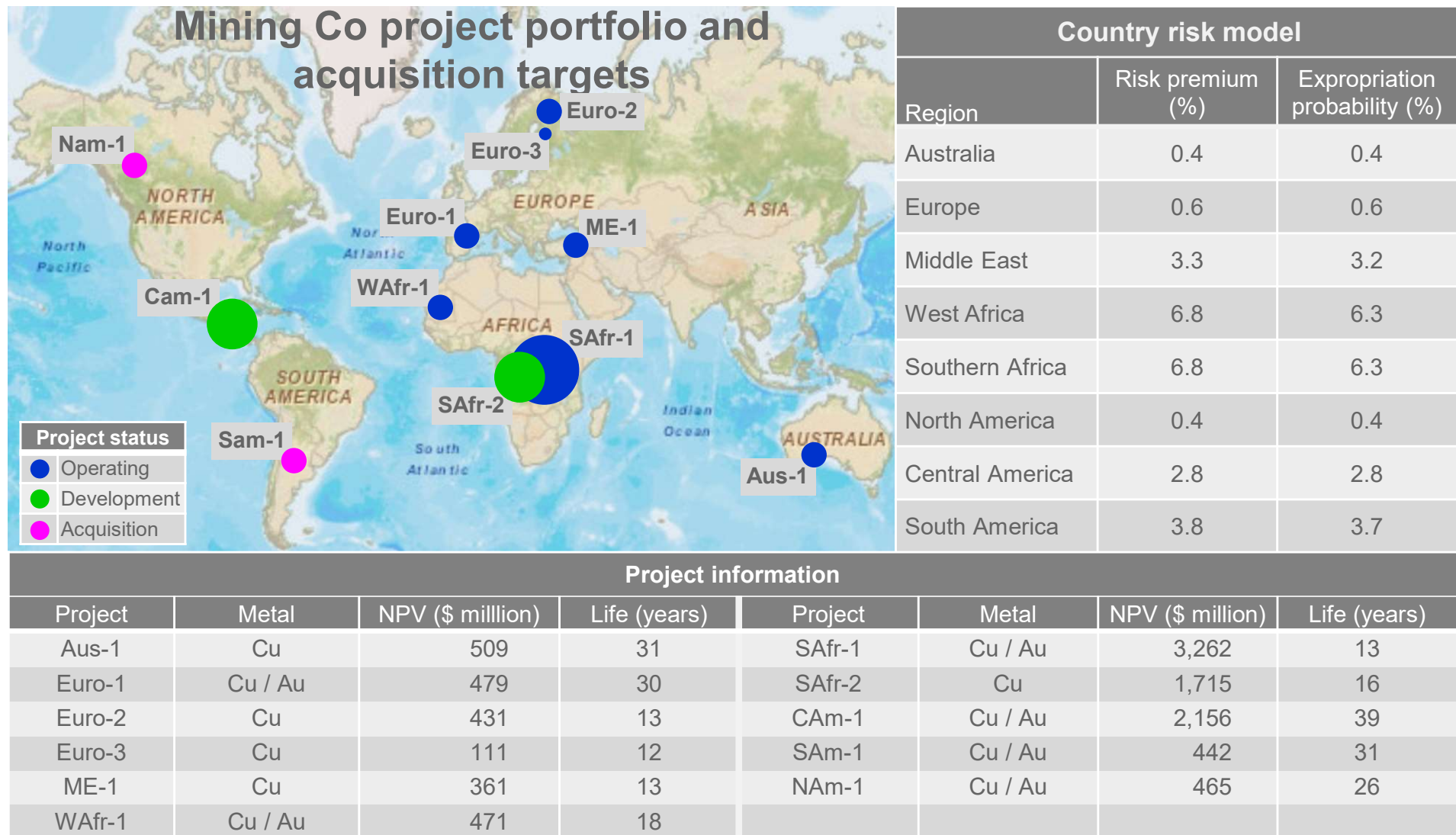
Solution:

Perform an analysis using simulation that recognizes the effects of commodity price and country risk on project cash flow and its translation into project and portfolio uncertainty.

- ▶ Mining Co's board is reviewing their copper / gold project portfolio and acquisition targets to assess risk exposure at both project and corporate levels. They are particularly interested in how geographic location affects risk exposure.
 - ▶ Previous portfolio reviews were based on Static CF models and did not measure risk exposure except through sensitivity analysis and qualitative scenario analysis.
- ▶ The main strategic investment decisions confronting Mining Co are:
 1. Development of a long-life project in Central America that costs \$5.9 billion to build. Three financing alternatives exist with different risk levels.
 2. Two acquisition targets located in North America and South America. The Board is concerned about how each affects overall corporate risk.

Example: Mining company portfolio analysis

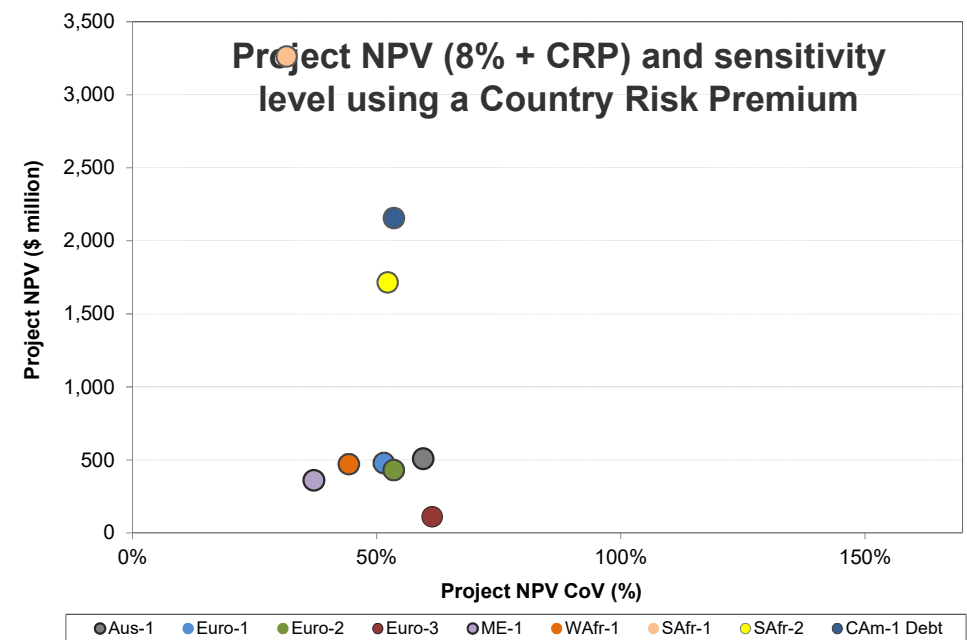
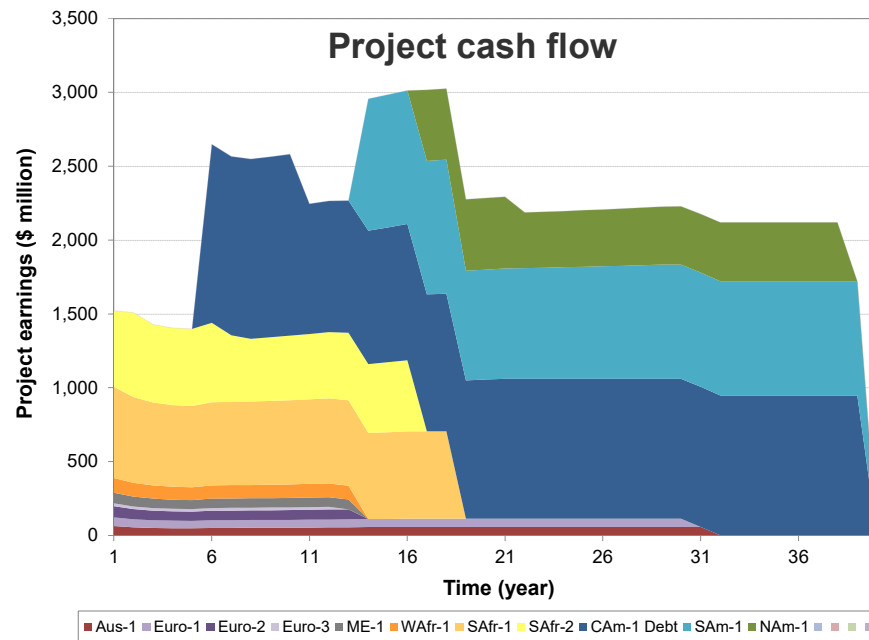
Mining Co's project portfolio and acquisition targets



Example: Mining company portfolio analysis

Project cash flow, NPV, and NPV uncertainty

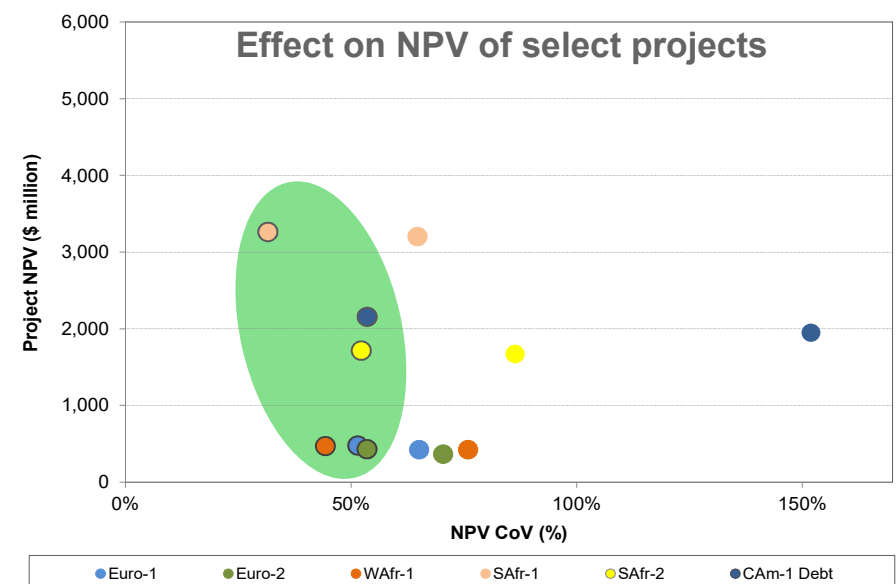
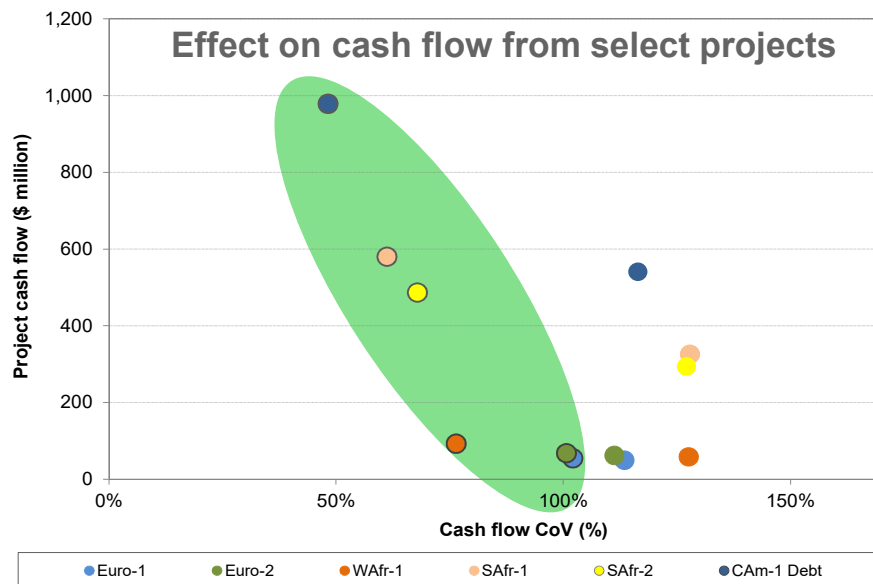
- ▶ Projects in regions of medium and high country risk make an important contribution to corporate earnings (**left graph**). Projects in low risk countries only provide a quarter of Mining Co earnings.
- ▶ Most projects have a similar level of NPV variability when country risk is incorporated into the discount rate (**right graph**).
 - ▶ All projects have an NPV CoV of between 40% and 60%.




Example: Mining company portfolio analysis

Country risk effect on cash flow and NPV uncertainty

- ▶ Recognizing country risk in the discount rate is a value effect. Simulating country risk translates this exposure into a cash flow effect.
- ▶ The following two graphs show how average annual cash flow, cash flow uncertainty, and NPV uncertainty changes when country risk is simulated.
 - ▶ Long life projects in high-risk countries are affected most as a country risk event that affects cash flow and value is more likely to occur over the project life.



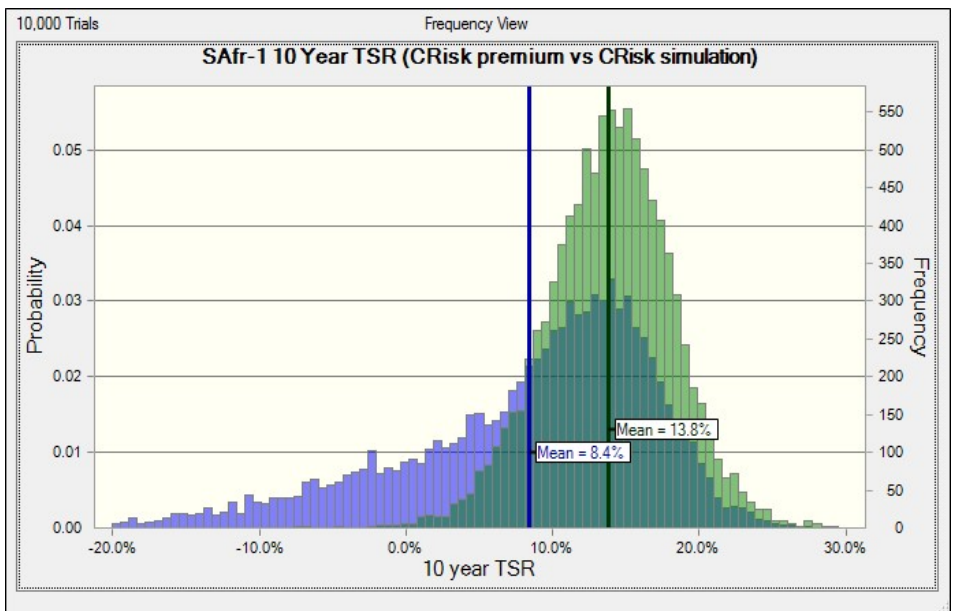
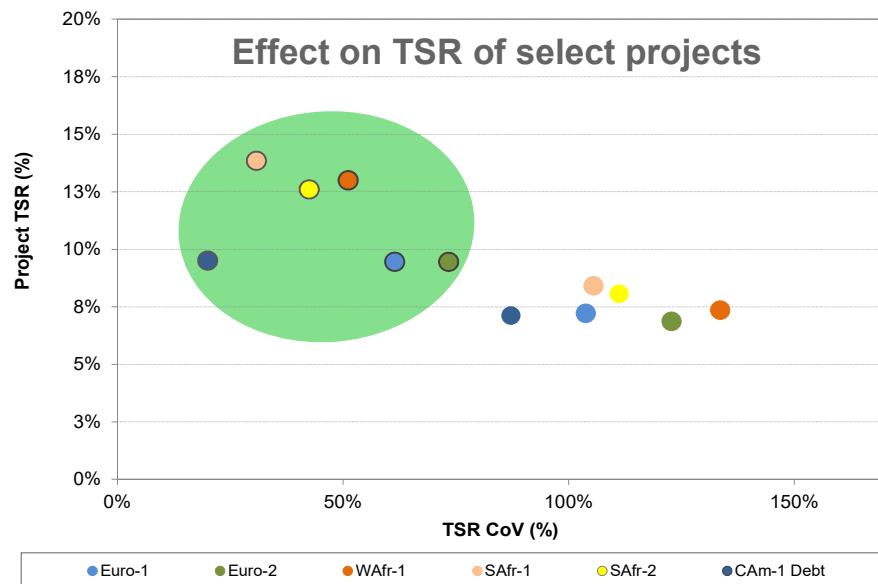
 Project NPV and risk when country risk is a rate premium.

 Project NPV and risk when country risk is simulated (no outside ring).

Example: Mining company portfolio analysis

Country risk effect on project TSR and TSR uncertainty

- ▶ Using a country risk premium can also cause Total Shareholder Return (“TSR”) uncertainty to be understated.
 - ▶ Modified TSRs used to allow analysis of full range of projects and cash flows.
- ▶ **Left graph** shows how simulating country risk reduces TSR and increases uncertainty. Blue histogram in the **right graph** shows the negative return tail created by simulating country risk.

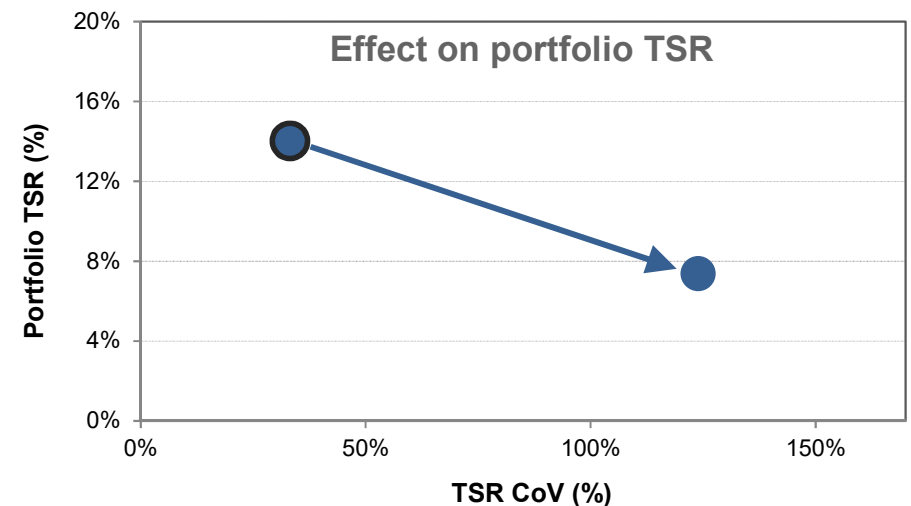
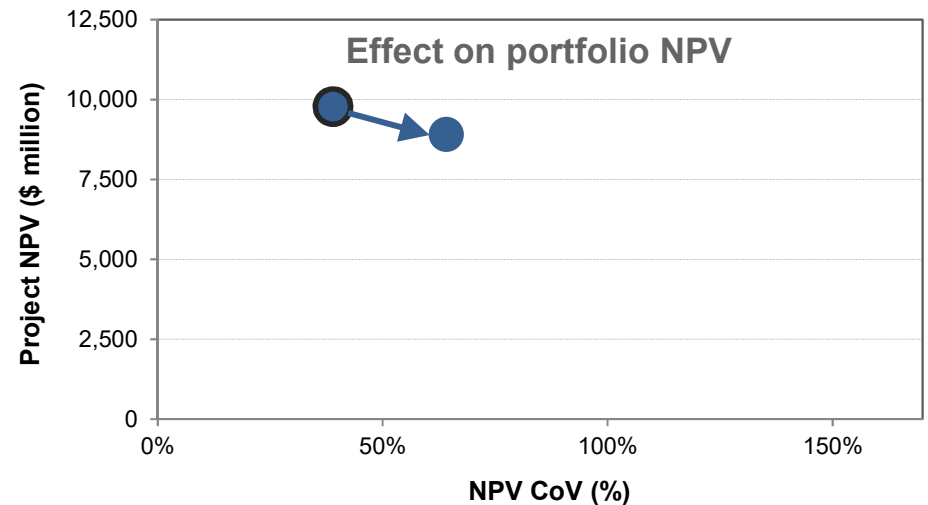


- Project TSR and risk when country risk is a rate premium.
- Project TSR and risk when country risk is simulated (no outside ring).

Example: Mining company portfolio analysis

Country risk effect on portfolio value and TSR uncertainty

- ▶ Simulating country risk results in higher portfolio NPV uncertainty. Portfolio NPV CoV increases from 39% to 64%.
- ▶ Portfolio TSR declines and TSR uncertainty increases when country risk is translated from a value effect into a cash flow effect.



- Portfolio NPV/TSR and risk when country risk is a rate premium.
- Portfolio NPV/TSR and risk from simulating country risk.

Example: Mining company portfolio analysis

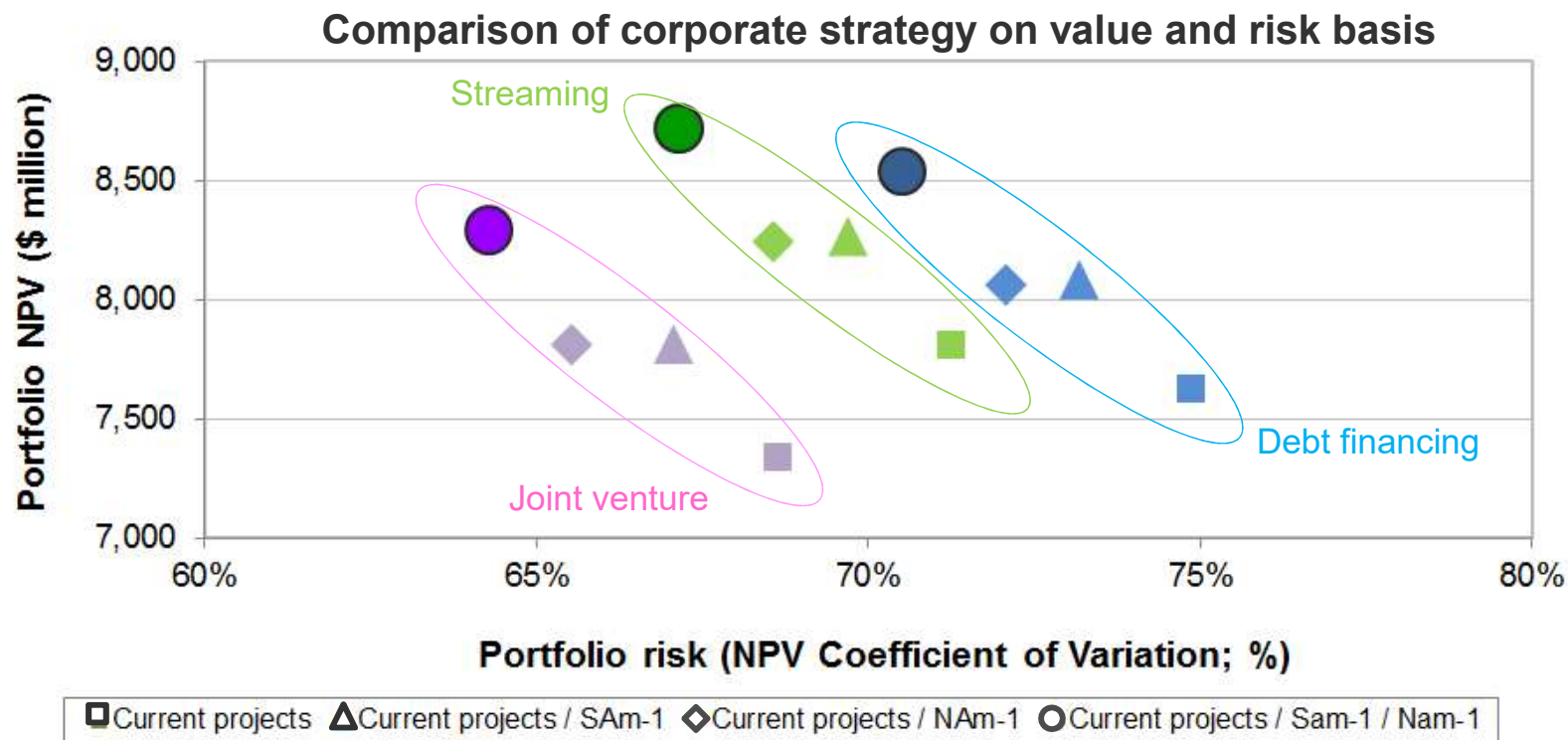
Alternative financing arrangements and portfolio choices

- ▶ The development of the CAm-1 Project is the most immediate strategic decision for Mining Co. There are three financing choices:
 - ▶ Debt finance: Arrange a \$1.2 billion facility with an interest rate of 6% and a repayment period of 15 years.
 - ▶ Gold stream: Add a gold stream deal to the above debt finance package. The gold stream will provide an additional \$900 million in development funds for the annual delivery of 128,000 Au ozs at a delivery price of \$400/oz. Stream IRR is 10%.
 - ▶ Joint venture: Sell 45% of the project to another copper producer for \$600 million. Proceeds will pay down existing corporate debt. Development costs decline from \$5.9 billion to \$3.3 billion. An additional project debt facility of \$660 million at 6% interest will be arranged later to finance construction.
- ▶ There are also decisions about whether to acquire either SAm-1 or NAm-1, or to acquire both projects.

Example: Mining company portfolio analysis

Portfolio value and risk level

- ▶ The various CA_m-1 financing strategies and portfolio combinations create different levels of portfolio risk.
 - ▶ The JV Strategy lowers portfolio risk by 10% with a small overall reduction in portfolio NPV.
 - ▶ Acquiring SA_m-1 lowers portfolio risk through diversification. Acquiring NA_m-1 lowers portfolio risk through both lower CR and diversification.
 - ▶ Portfolio NPV CoVs are approximately 40% if we do not simulate country risk.



Example: Mining company portfolio analysis

Some final thoughts...

- ▶ Country risk is most often recognized in a cash flow model by attaching a specific risk premium to the discount rate. However, in this example, treating country risk as a value effect rather than a cash flow effect:

Conceals actual project risk exposure due to location, which results in...

Incorrectly representing the interplay between country risk and project-specific characteristics such as development capital and mine life, which can lead to...

Poor alignment between a company's global investment portfolio and its stated investment strategy and risk guidelines.



Appendix: Presenter professional biographies



Michael Samis, Ph.D., P.Eng.

Associate partner

Valuation & Business Modelling

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Dr. Michael Samis, P.Eng. is a leading Integrated Valuation and Risk Modelling practitioner in the natural resource industries with more than 25 years of mining experience. He has extensive professional experience valuing base and precious metals, diamond, and petroleum projects with complex forms of flexibility and risk. His assignments have ranged from exploration stage to late-stage capital investments and have also included the analysis of project financing and contingent taxes. Mike has presented more than 30 professional courses on advanced valuation at universities, natural resource companies, and professional organizations world-wide and has published or presented numerous valuation papers about flexible pushback development, multi-stage exploration programs, windfall taxes, and the economic impact of project finance and hedging. Dr Samis is a registered Professional Engineer in Ontario, Canada, and a qualified person for project valuation under NI43-101 guidelines. In 2013, the Canadian Institute of Mining and Metallurgy awarded Mike with the Robert Elver Award for his contributions to the Canadian mining industry in the field of mineral economics. He holds a Ph.D. from the University of British Columbia that combines the fields of mining engineering and finance.

Dr Samis is currently an Associate Partner (Valuation and Business Modelling) in the Toronto office of Ernst and Young's Transaction Advisory Service where he and his team also value complex financial securities such as employee stock options, convertible debt with embedded derivatives, contingent contracts, and interest rate, commodity, and foreign exchange derivatives.

Professional background and qualifications:

University of British Columbia, Ph.D. in Mining Engineering and Finance

University of the Witwatersrand, MSc. In Mineral Economics

University of British Columbia, BSc. in Mining Engineering

Professional engineer registered in Ontario, Canada

Qualified person for project evaluation under NI43-101 guidelines

Member of the 2012 Review Committee for CIM Val Guidelines

Presented with the 2013 Robert Elver Award by the Canadian Institute of Mining and Metallurgy



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John Seddon is a Principal for Control Risks in Canada. He has extensive experience consulting to investors and multinational companies across all industries, particularly in relation to matters in emerging and frontier markets. Since joining Control Risks in 2005, John has worked with clients on-the-ground in more than 40 countries, advising on strategies to manage integrity, political and security risks and to maximise their commercial opportunities. Immediately prior to his current role in Canada, John was a Director based in Lagos, Nigeria and Nairobi, Kenya. John holds a BA from McGill University, a MLitt from the University of St. Andrews and an International Diploma in Risk Management from the UK's Institute of Risk Management.

Professional background and qualifications:

McGill University, BA

University of Saint Andrews, MA. in Economics

International Diploma in Risk Management, Institute of Risk Management