<u>Work **in progress**</u>: Financial & Strategic Performance of Mining Companies

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Backward looking statement

- Most of my knowledge of mines and economics was injected into me at UBC, not far from here, as my lawyer can confirm.
- Comments of a possibly caustic nature may be perceived by some listeners. Anyone easily offended might want to leave now.
- All comments, caustic and otherwise, are entirely backward looking and are based solely on historical data. Causing emotional distress in some people is not intended.

Overview

- Dichotomy
  - A division in halves – which is not necessarily what is going on
- Strategic performance
  - Strongly stated, less strongly followed up upon
- Operational performance using metrics
- Thinking – we hope managers do think
- Discussion

A dichotomy…???

- Some major mining companies have lost large sums in recent years
  - RioTinto-Alcan….”probably the worst mining deal ever”
  - BHP….big loss on energy diversification
  - Freeport….same
  - Barrick….Pasqua Lama and others
- Operations don't seem all that bad
- However, one major Gold mining Company used Excel for mine optimization until recently

A working hypothesis

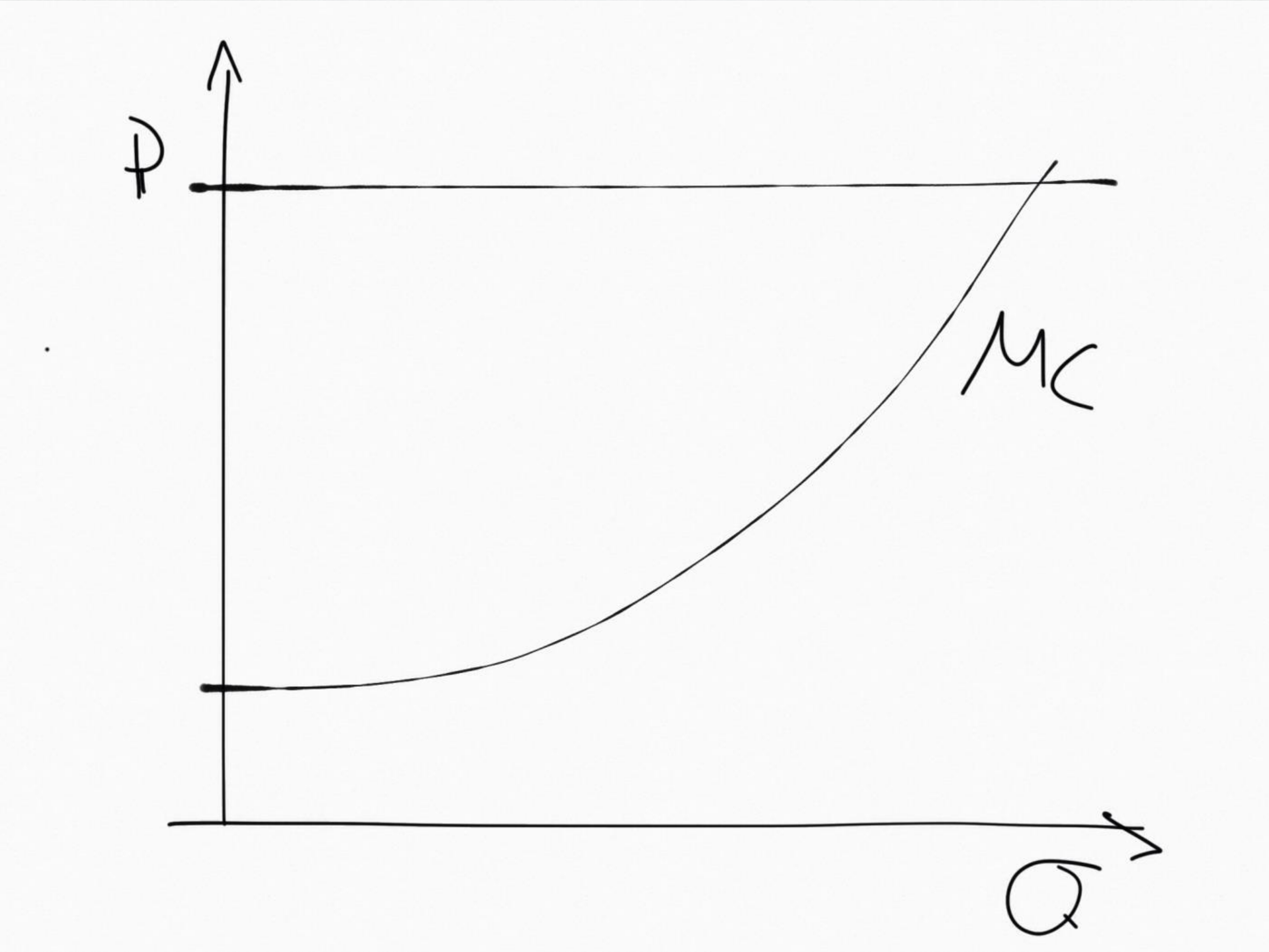
- *There is a disconnect between individual mine operations performing fairly well, and the ability of company head office to loose substantial sums on ill advised dealmaking.*
- How might this be explained?
- Agency problems, in the form of "hidden action"?
- The problem is providing enough compelling evidence

How to pursue this hypothesis

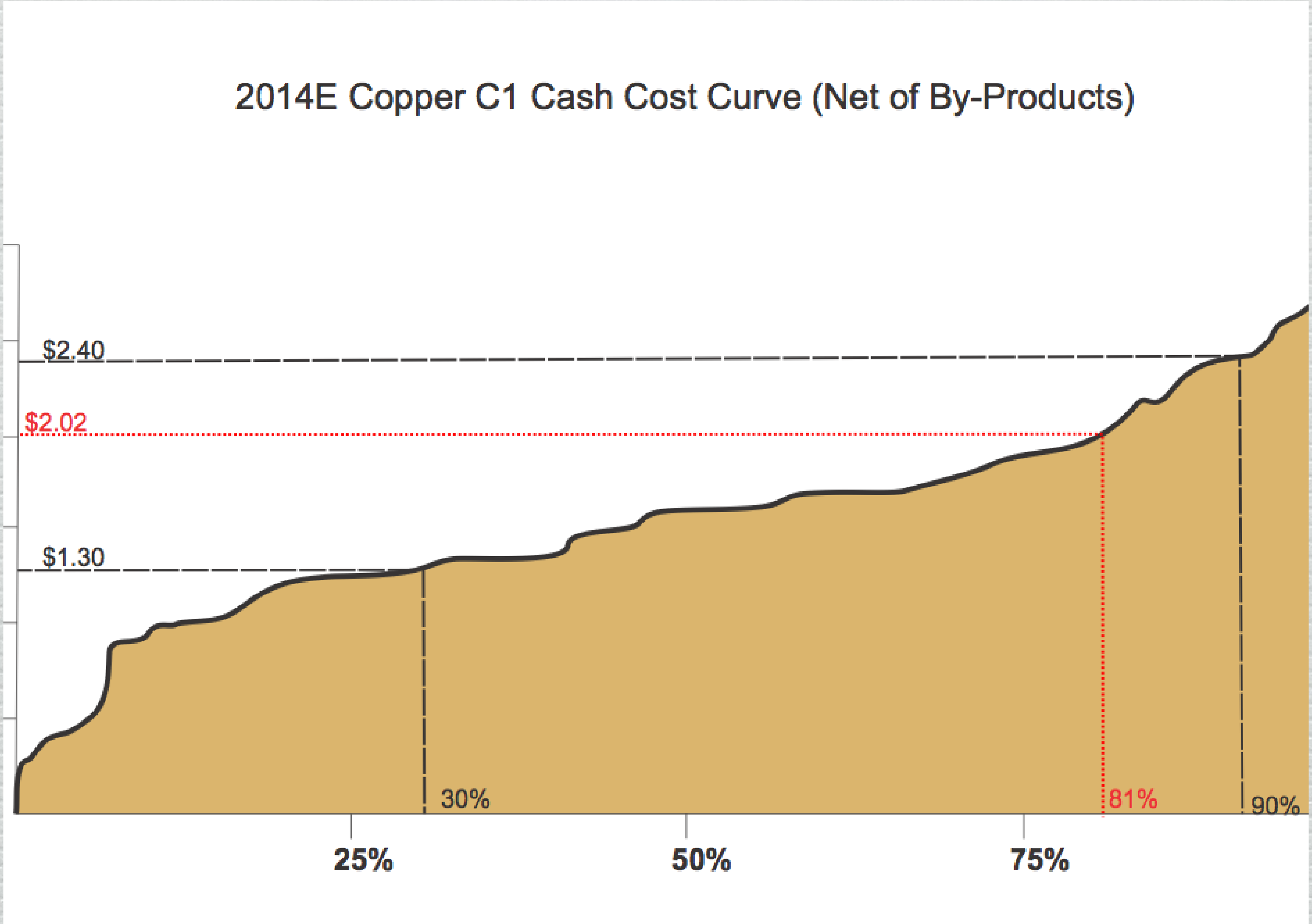
- Theory path
  - Sources of rent, sharing of rent, competing for rent
  - We’ll save that for some other day and it still won’t provide the evidence
- Empirical path
  - Look for data that might indicate quality of management
  - This is today's focus

Some basic mining parameters

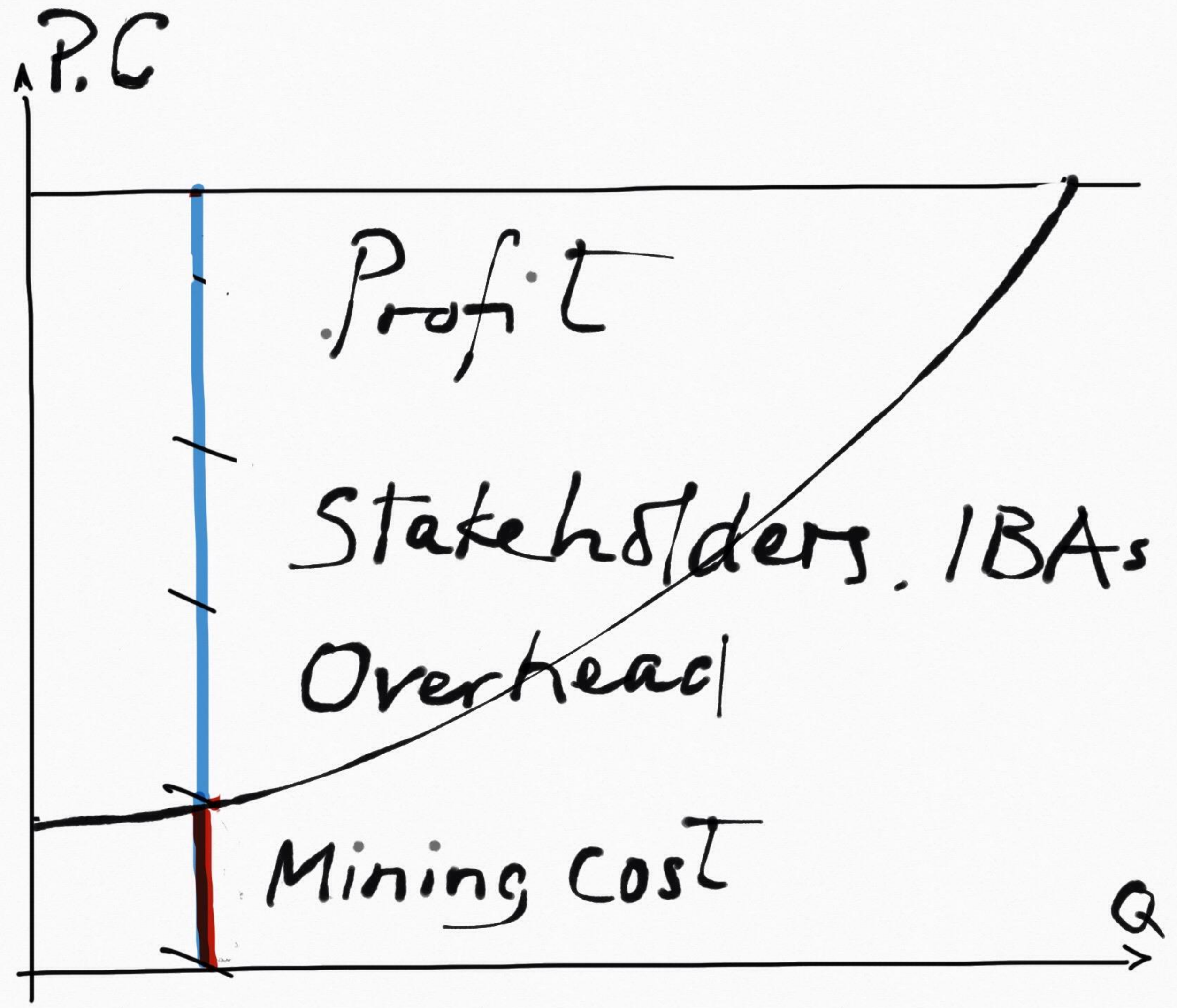
- Ore grade
- Ore volume, reserves, resources, proven
- Cut-off grade
- Recovery
- Dilution
- Capital cost
- Operating cost



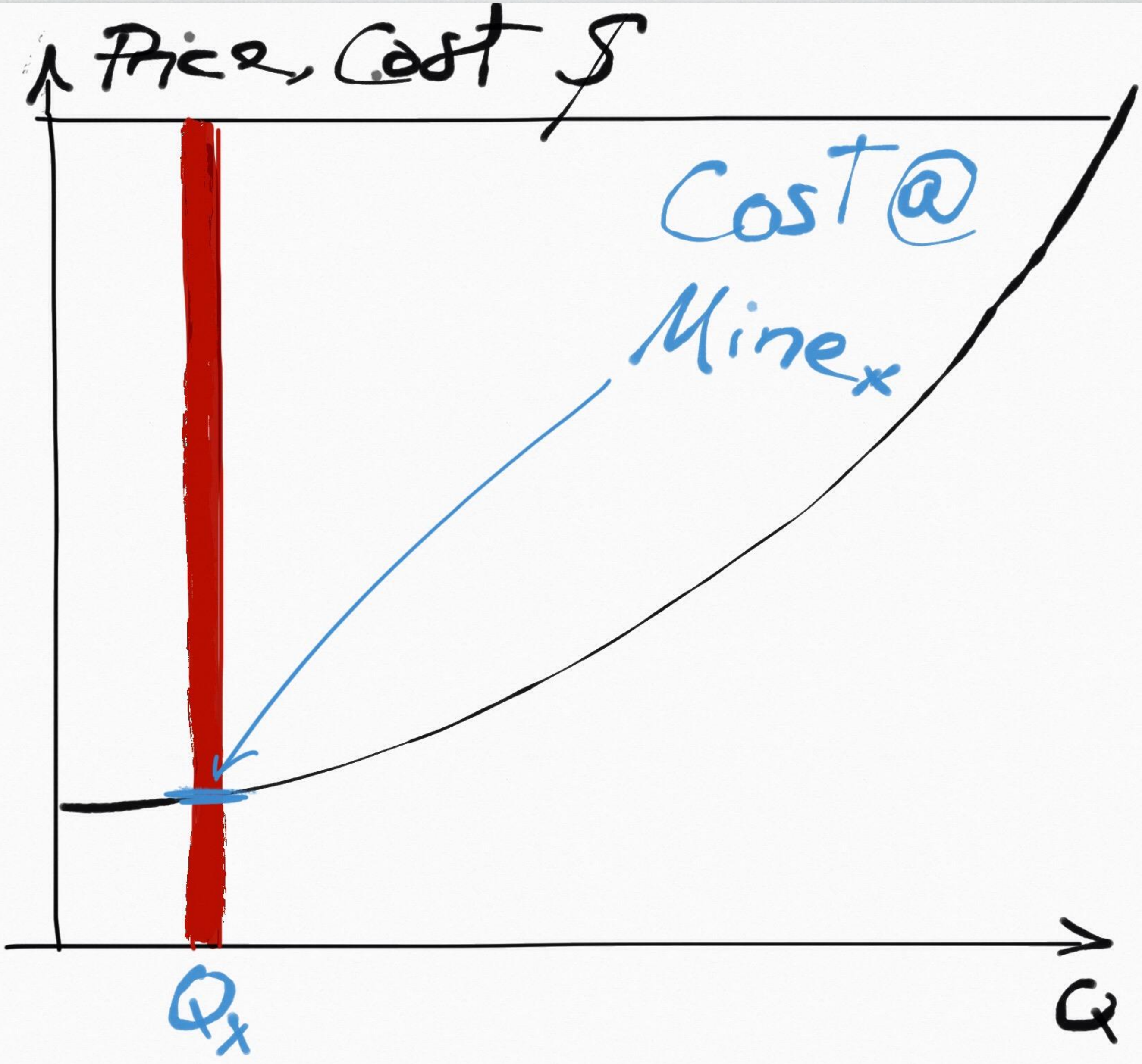
Minerals cost curve



This is what it really looks like



Costs, profits, distribution


Price, Cost $
Cost@
Mine$_x$
Q_x
Q

With a few assumptions

- Disagram area betwen MC and P represents an estimate of the mineral rent, the profit due to specifics of the deposit or mine

- Low unit cost and high grade have high profit per unit of material sold

- There is just one problem: how low are ”low” costs and why are they so low?

The grade-tonnage-skill problem

- Which part of mining profits are due to high grade ore and which part can be attributed to low mining and processing cost?
- Even the best mine can be destoyed financially by use of costly methods and overstaffing
- Poor mines can be made profitable with sufficient ingenuity (not all, some).
- Ingenuity, creativity, innovation, <u>may</u> contribute to profits – but these profits are not derived from minerals.
- For now, we must accept that the streams of profit are inseperable

Measures of performance

- Profits, market price, dividend? - rather too random
- RoE, RoA? - maybe a bit, still somewhat random
- Cash cost per ounce? - risk of spin
- All-in sustaining cost? - new but maybe a slim chance
- True Cash Cost? - a possible control on AiSC

All-in sustaining cost

- Cost of production at the mine site
- Exploration
- Head office overheads
- Sustaining capital (development etc.)

Can cost be an indication of company performance?

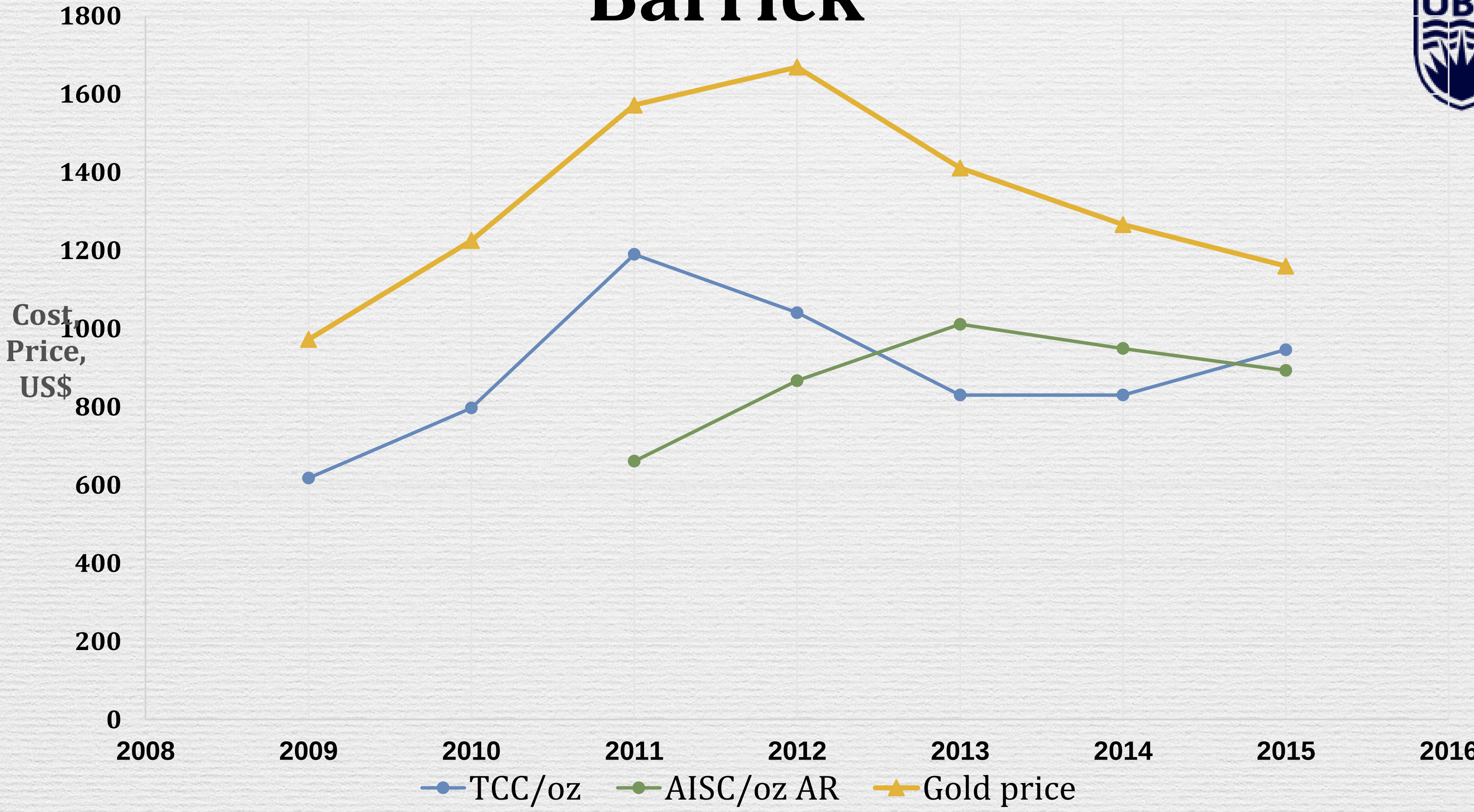
- Possibly, if we can break the reported date down into meaningful components

- Candidate 1: True Cash Costs

$$TCC = \frac{TR - CfOP - \Delta WC}{Q}$$

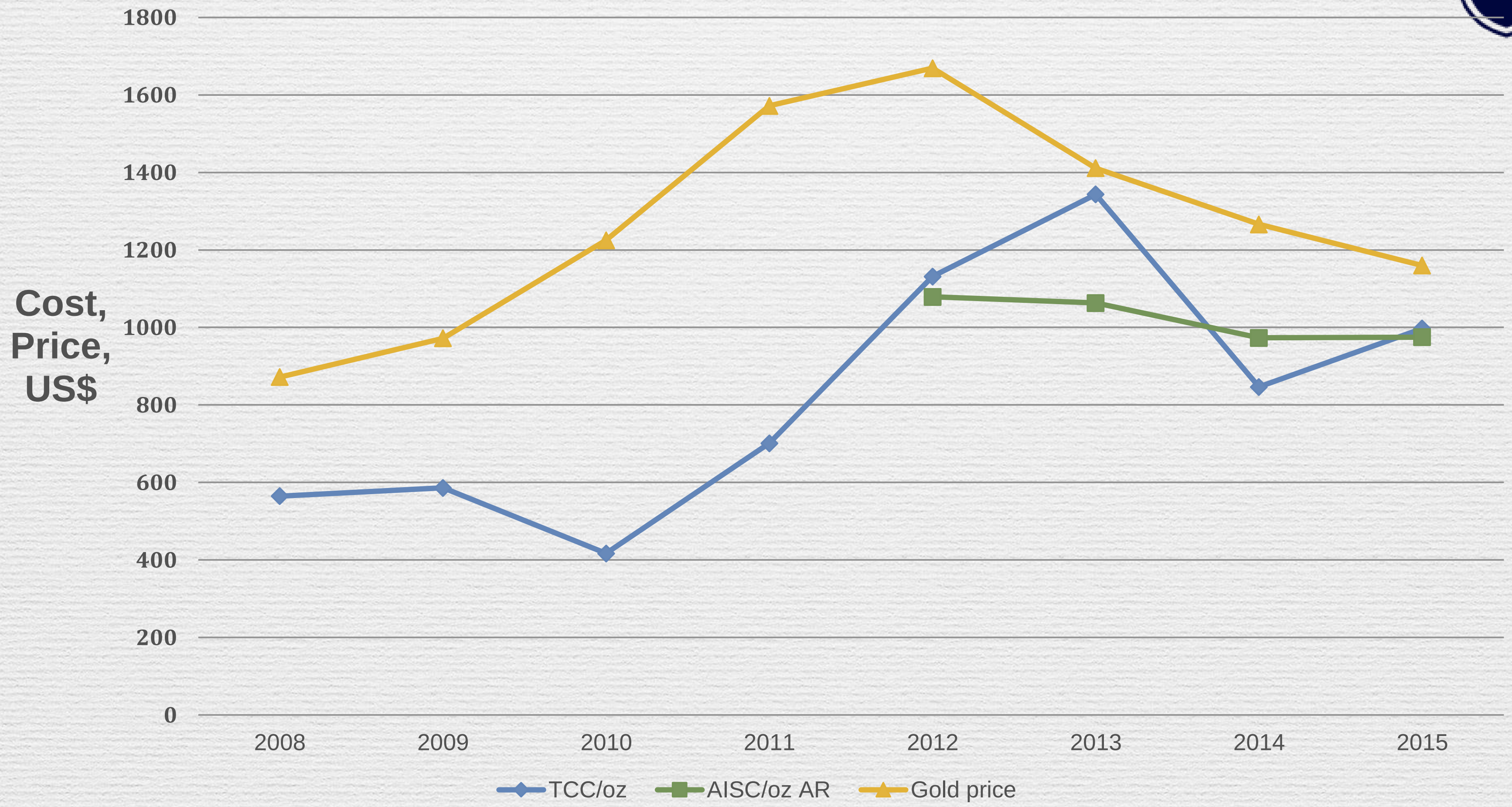
- Candidate 2: All-in sustaining costs

Barrick



1800
1600
1400
1200
1000
800
600
400
200
0
Cost, Price, US$
2008
2009
2010
2011
2012
2013
2014
2015
2016
TCC/oz
AISC/oz AR
Gold price

Kinross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Gold price

Indications from a few data points

- All-in sustaining costs seems to follow TCC fairly well.
- Many other factors might impact costs over time
- All-in sustaining costs is a short time-series, more years of data are required
- Quarterly reporting might provide a more detailed picture
- Companies seems to have reacted fairly rapidly when Gold prices fell.

Alternative indicators of performance

- Costs per tonne mined - for both ore & WASTE
- At each mine
- For each quarter
- Compared to rates of external change in mineral price, key cost drivers, eg. energy
- Ideal indicator might compare change in external variables to the response by mining companies in terms of change in internal variable(s) such as cost.
- Also lag and rates of change.

Back to the hypothesis

- Focus on cost may assist in understanding drivers of company performance
- It may indicate managerial ability in operations
- Alas, it tells us very little about strategic ability