Portfolio Decision Quality Adds Value

Presented to
Decision Analysis Affinity Group
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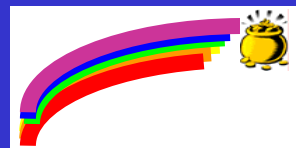
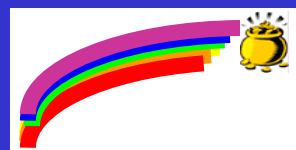


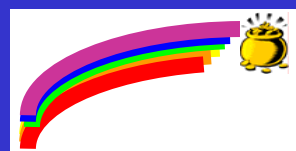
Agenda

1. Portfolio decision quality
2. Value added
3. Recommendations and conclusion



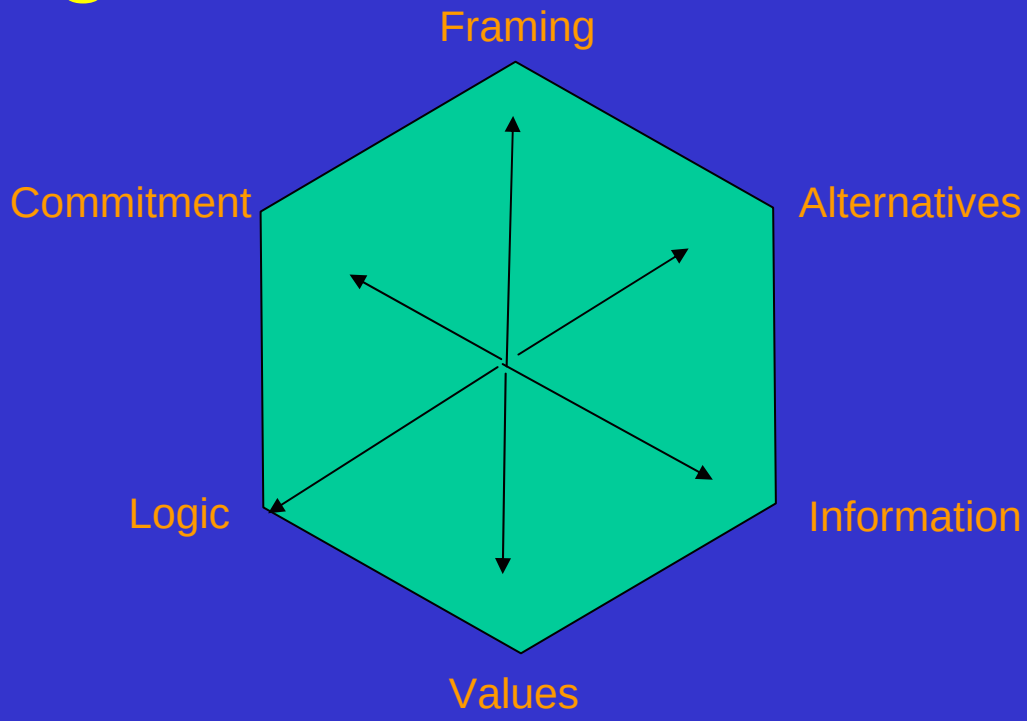
1. Portfolio Decision Quality

- My background: Lots of portfolio DA projects – some good, some bad
- Motivating question: How to make value added by portfolio decision analysis commensurate with the efforts it entails?
- Decision quality provides a useful framework



The Decision Quality* framework says that the decision process is only as strong as its weakest link

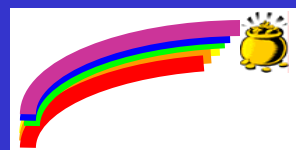
100% quality in each dimension is the level where additional effort would stop providing sufficient benefit



*Developed primarily by Ron Howard, James Matheson and others at Strategic Decisions Group and Stanford University

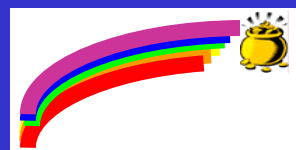
What is unique about portfolio decision making?

- Projects may compete for the same resources
- Projects may contribute to the same goals
- Projects may affect each other's prospects
- Many combinations and permutations
- Potentially much to analyze

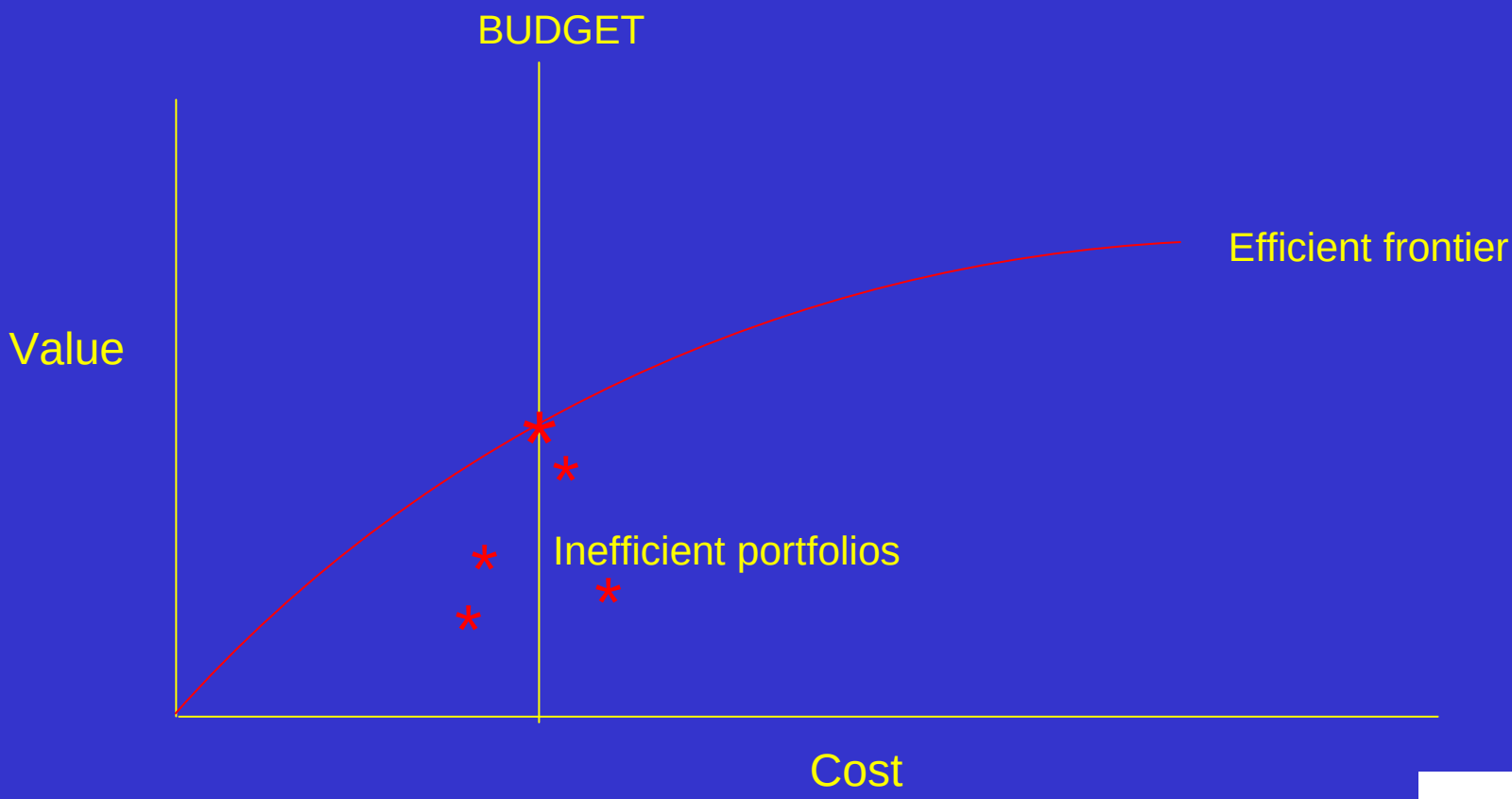


Portfolio decision quality elements

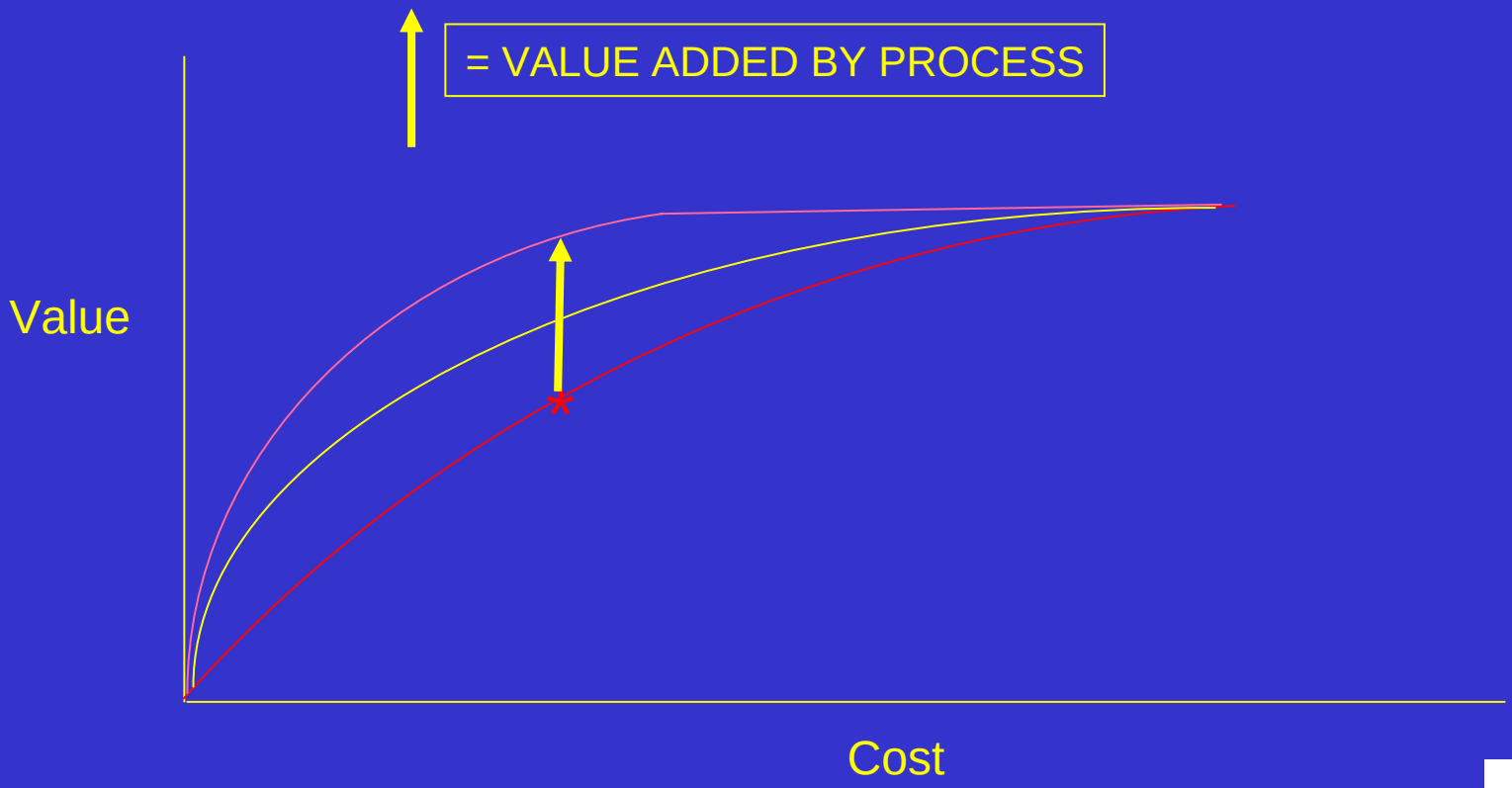
- Frame: What is the budget, what projects are in play?
- Alternatives: Is it possible to improve project level alternatives, and thereby enrich the ability to shift funds across the portfolio?
- Values: Scoring systems vs. NPV
- Information: Level of detail for each project
- Logic: Consider interactions between projects, balance between projects, not just rank and fund
- Implementation: Grow the good, kill the bad, update



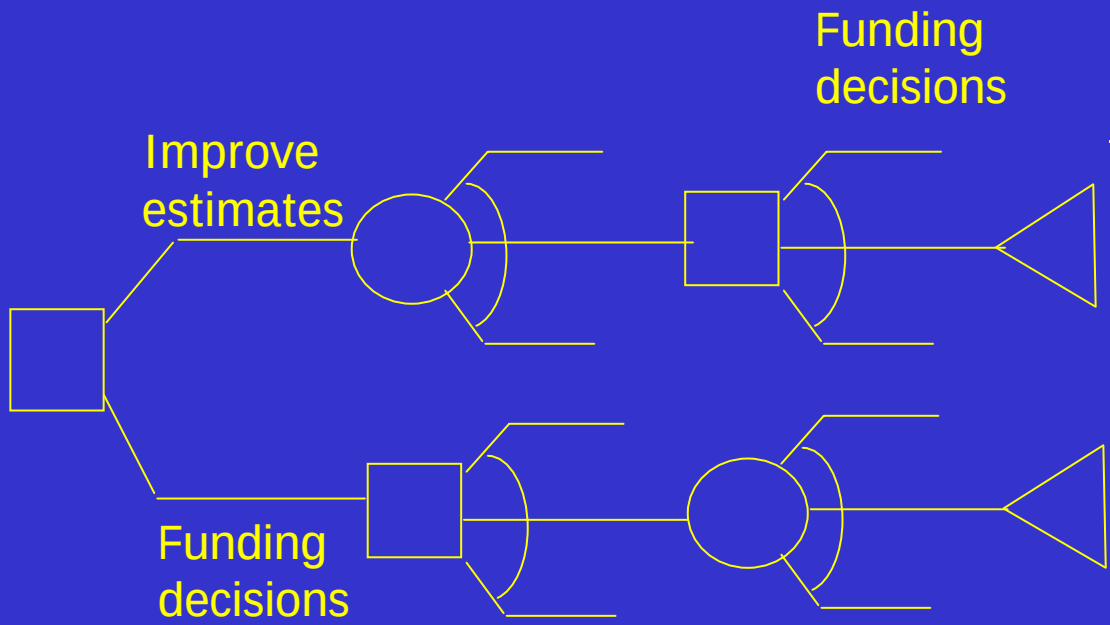
To maximize value derived from an available budget, we essentially choose a point on the efficient frontier



The possibility curve can be improved with better information and implementation



The portfolio problem is well defined, so value added can be estimated as value of information



Final portfolio expected value

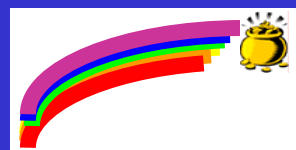
Full analysis

Prioritization based On initial estimates

Learn what appropriate estimates would have been

KEY CONCEPT

2. Value added

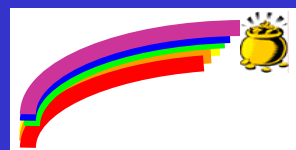


Information:
Precision of value estimates

Company 1: “Why are we doing all this work when we already know what will be funded?”

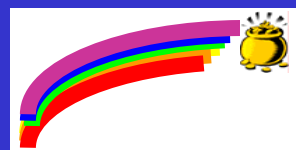
vs.

Company 2: “There is a lot at stake, so don’t just shoot from the hip.”

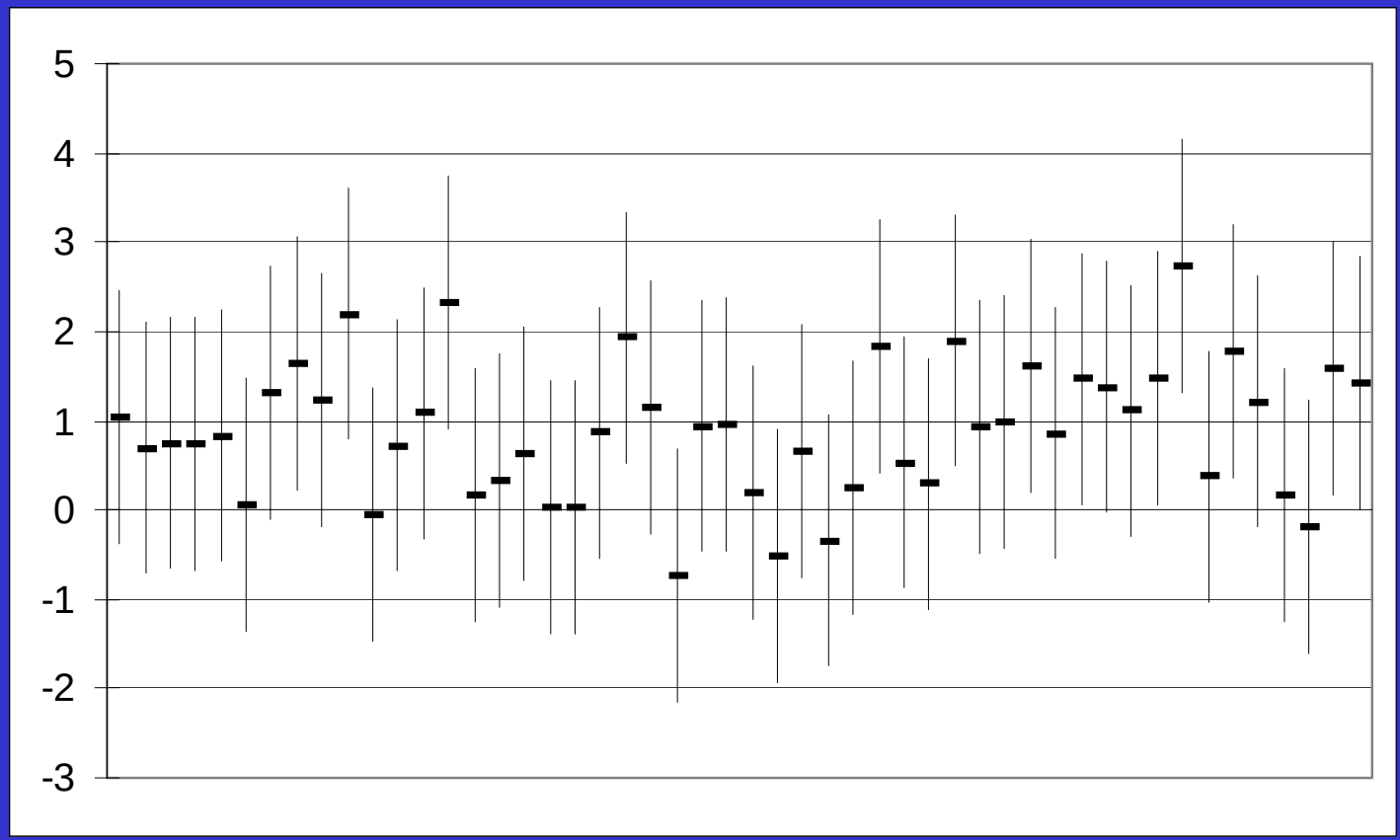


A simulated example illustrates how precision adds value

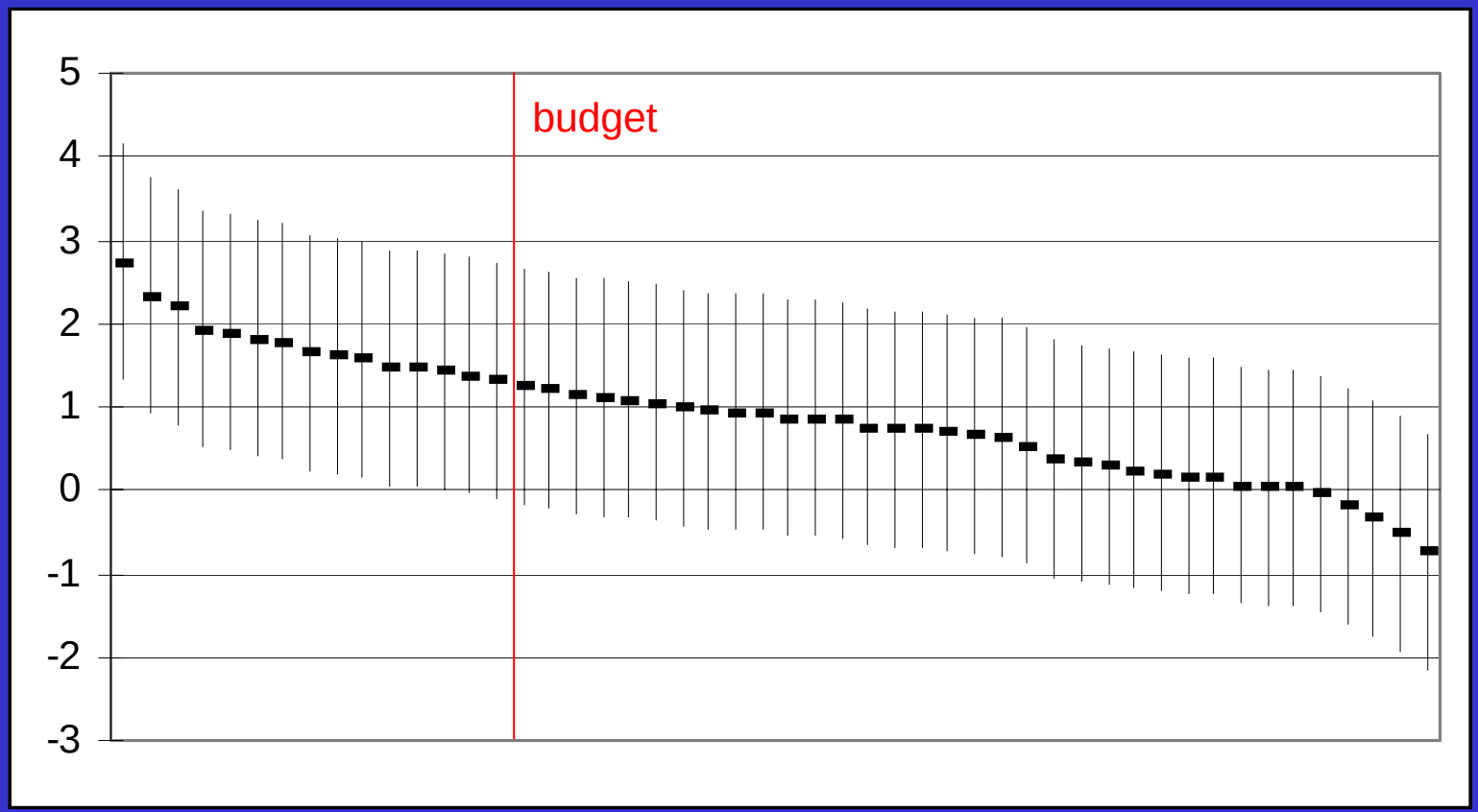
- A set of 40 candidate projects
- Value-to-cost ratio of projects follows a log-normal distribution (consistent with empirical data)
- Projects all have same cost (to keep things simple)
- Budget sufficient to fund 15 projects
- Portfolio manager can make “noisy” intuitive estimates of project value, or can expend efforts to develop precise assessments



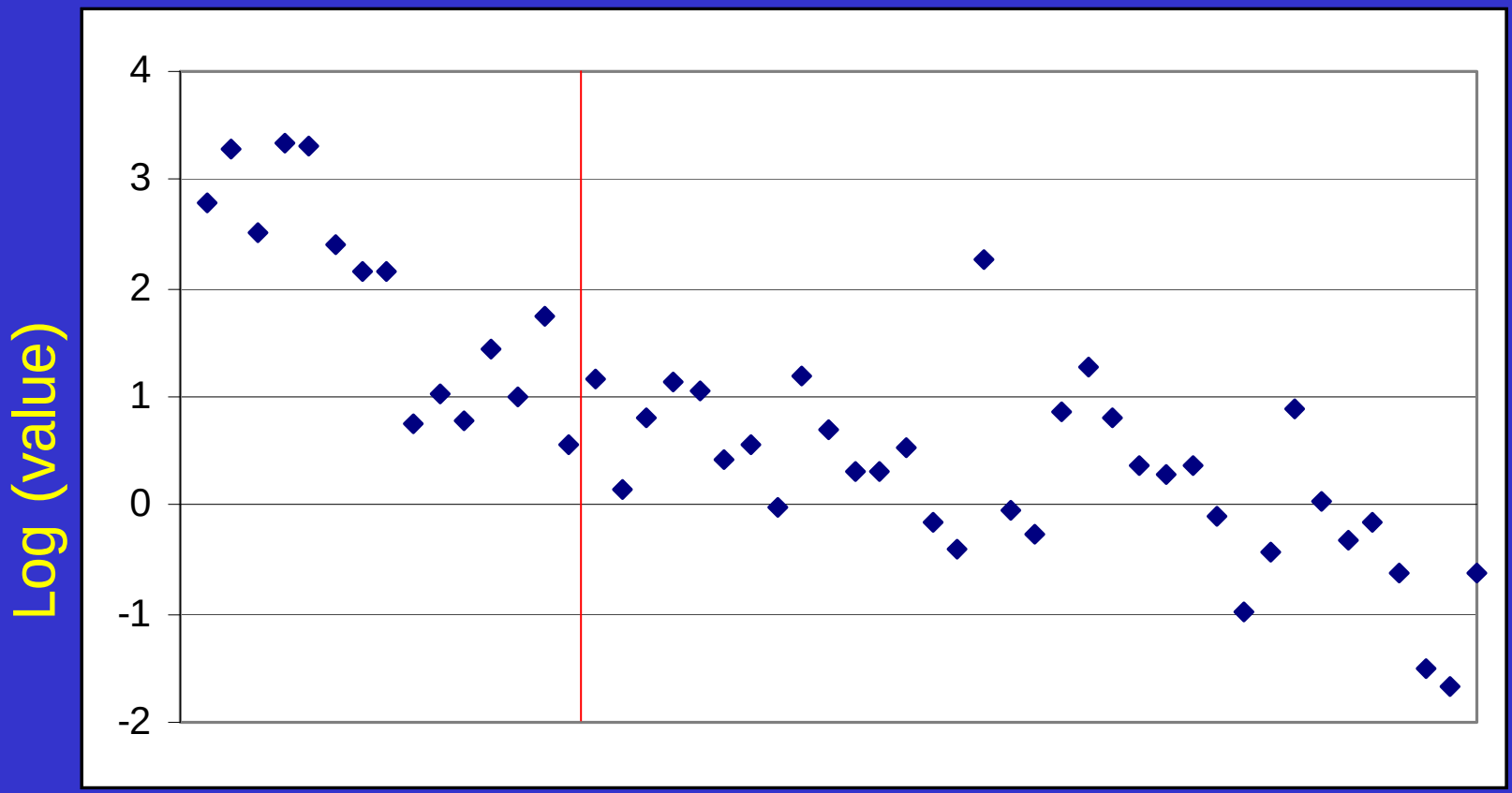
The portfolio manager must decide which projects to fund



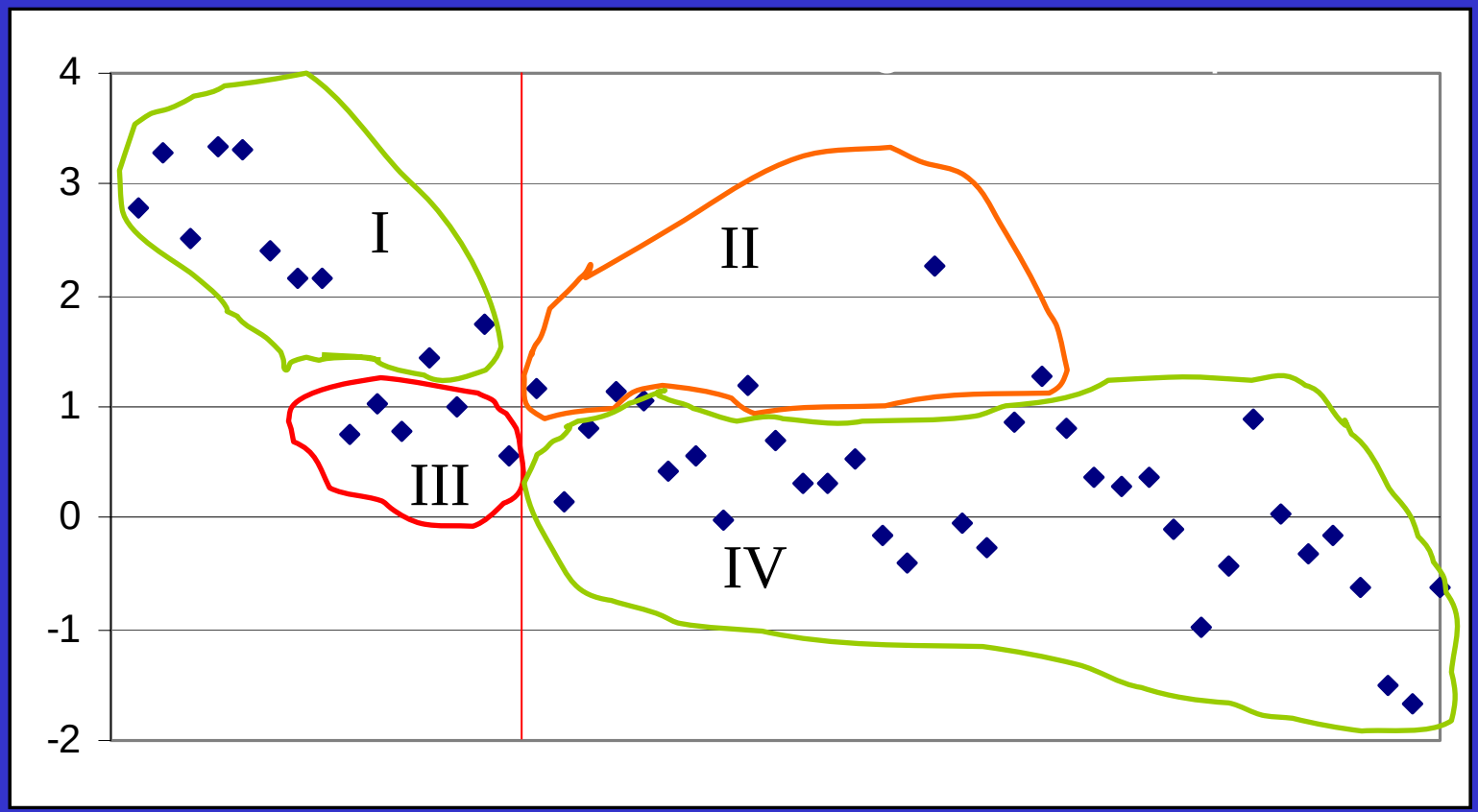
Could prioritize by estimated value.



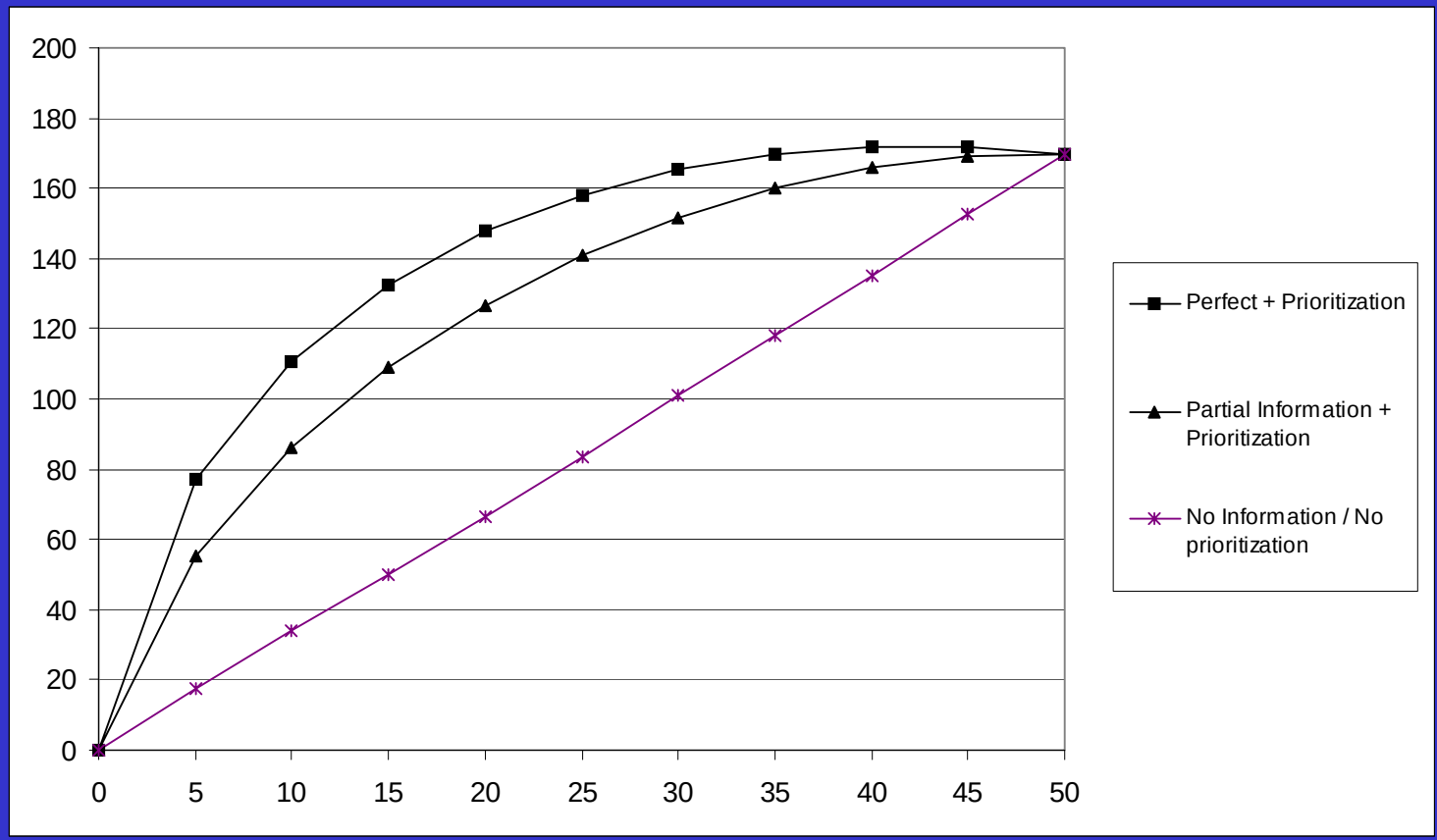
Actual values (when projects are sorted by estimated value)



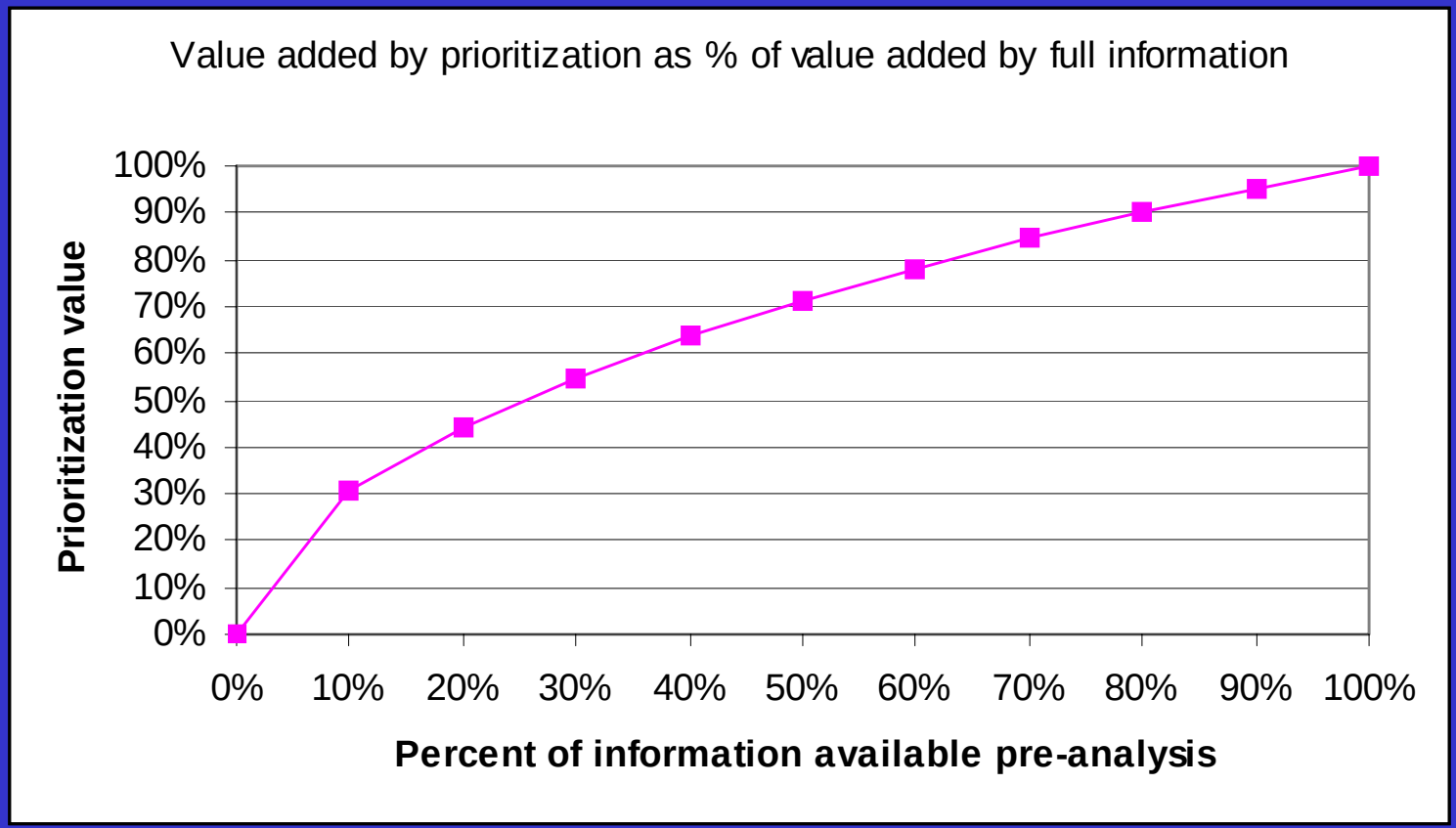
10/15 funded projects were correctly identified.



Simulation results showed that *disciplined* application of intuitive value judgments is of primary importance, and perfect estimates add significant additional value

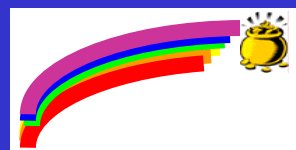


Prioritization is worth relatively more and additional information is worth less when initial estimates are accurate



Two possible shortcuts

- Triage: adds 75% of value for 50% of effort
  - If there is a wide spread across projects
- Threshold rule: Fund each project if its productivity index exceeds a given level
  - Can be just as good as full ranking
  - But fails unless the threshold is set very accurately
    - Sometimes could estimate from experience

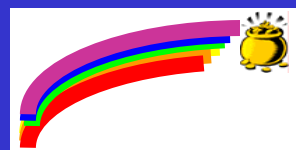


Alternatives:
Multiple project funding levels

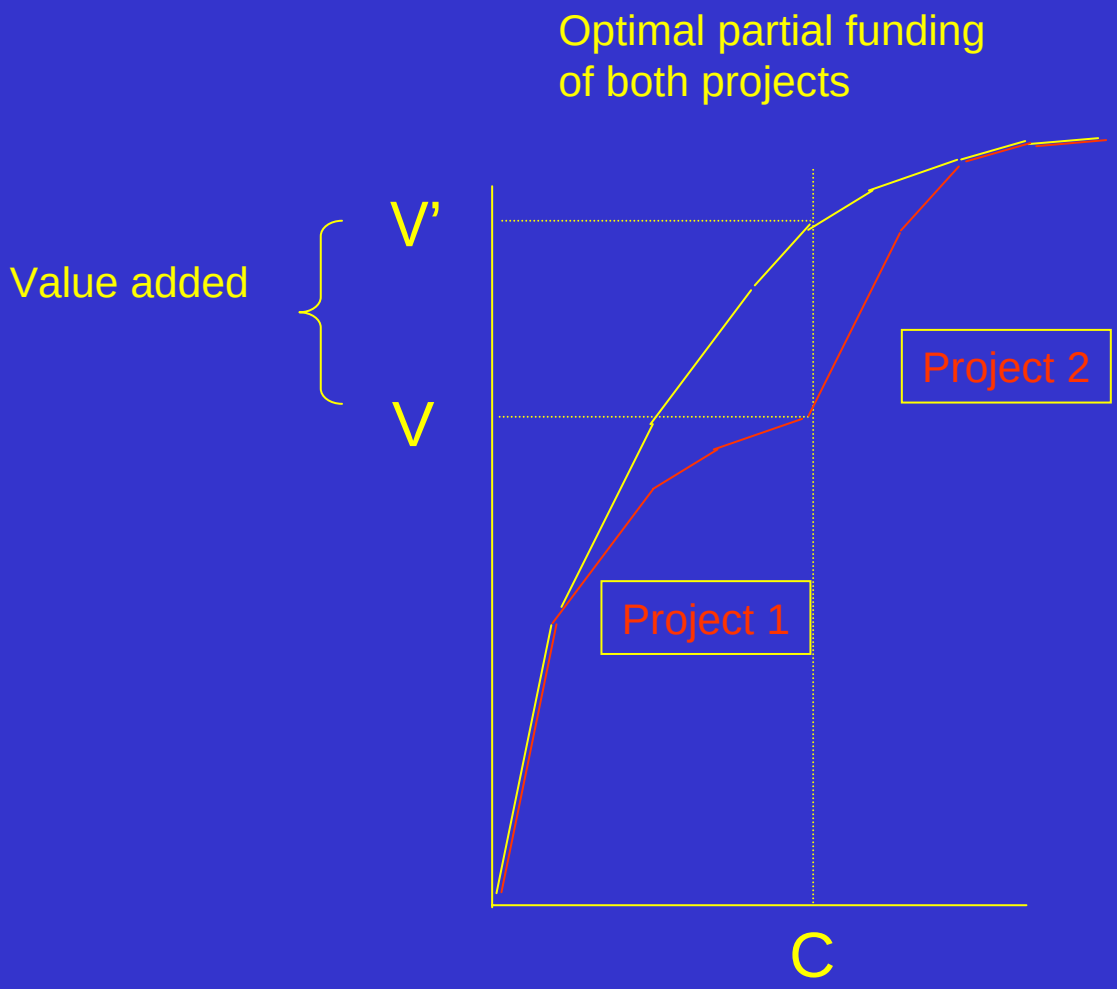
Company 1: “Fund the project or kill it”

vs.

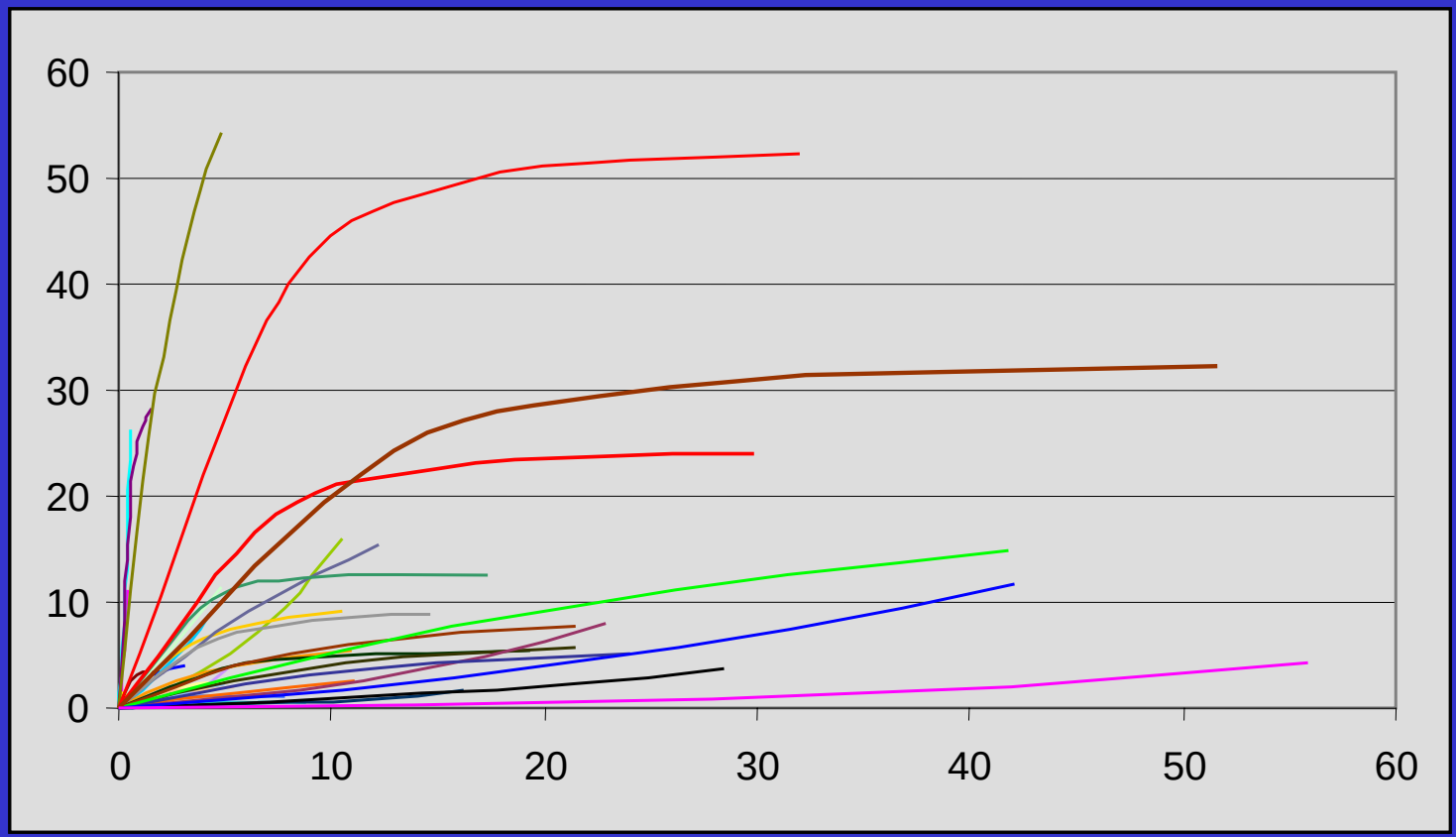
Company 2: “Prepare several plans just in case we have more or less funding”



Project funding alternatives add value



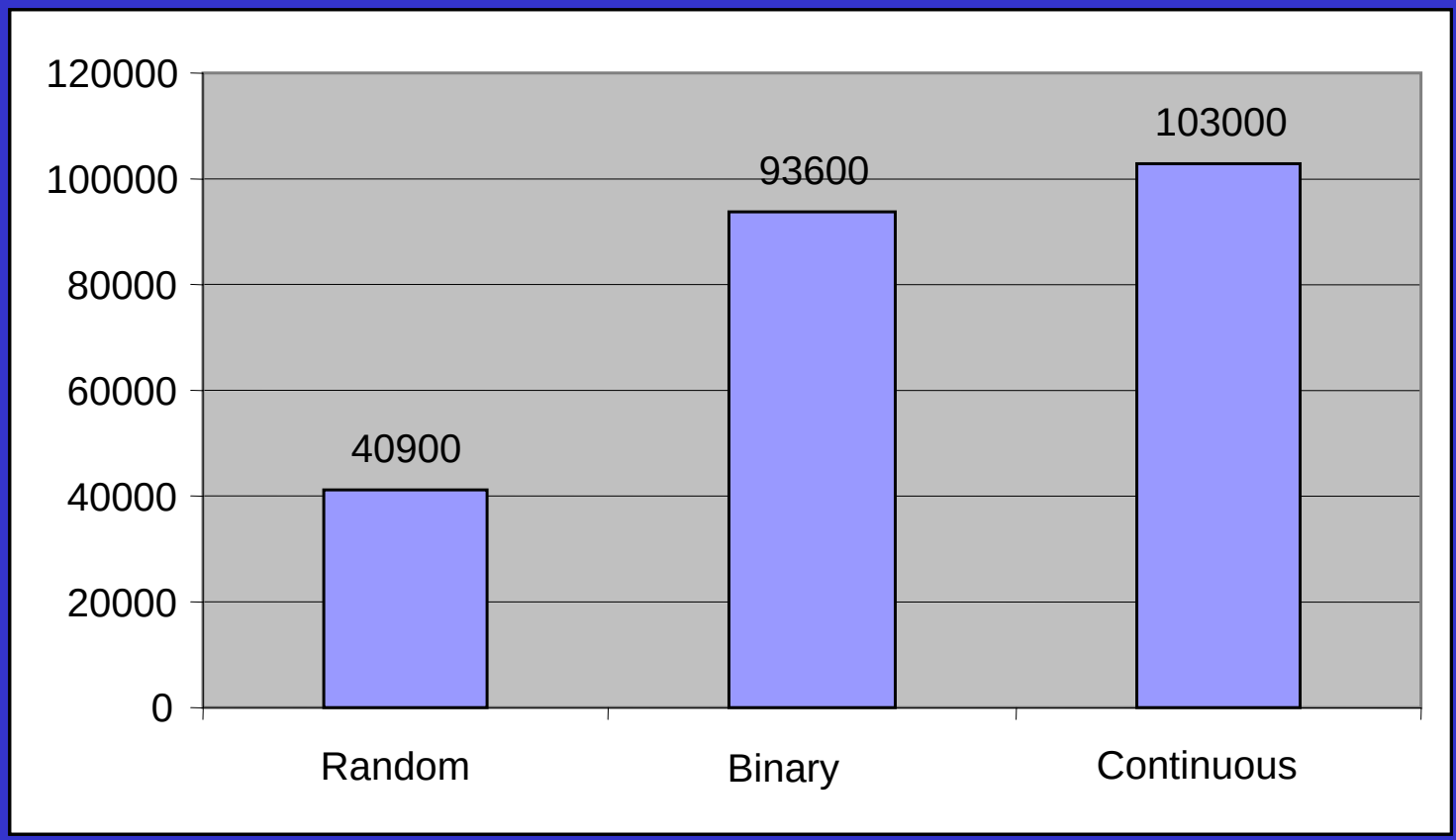
Buyup curves for one simulated portfolio



Value

Cost

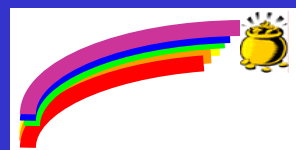
Simulation results: Evaluating multiple project-level alternatives* accounts for 15% of value added



* 2 interior alternatives gives 99% of theoretical value added

But results are quite sensitive to portfolio characteristics

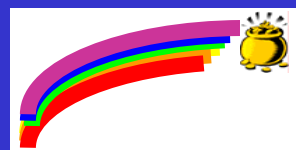
- If budget cut by 50%, rich alternatives are relatively more valuable
- If returns to scale are more strongly decreasing, rich alternatives are much more valuable
  - In this case, just trimming each project's budget – less for more attractive projects - can be a very effective shortcut (96% of value added)



Observations: Four natural quality grades (information levels) to consider for each element

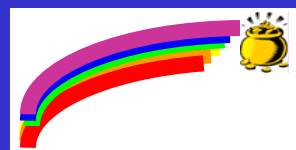
- None
- Portfolio level
- Project level estimate
- Project level analysis

- Value added for each level depends on situation's characteristics

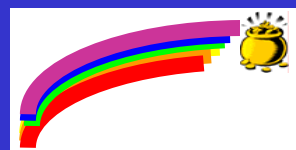


Other results are similar

- Logic – synergies
- Values – right measures
- Frame – boundaries and budget

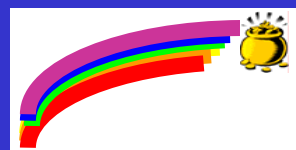


3. Recommendations



Consciously manage your portfolio process

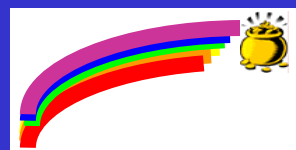
- Look at your portfolio and characterize it
- Keep track of results for potential future use in shortcuts
- Relate current processes to PDQ
- Look for
  - Easy improvements (where shortcuts work)
  - Saved efforts (where shortcuts work)
  - Places where higher quality needed
  - Potential for efforts to be scaled back



Characterize at the portfolio level in terms of mean, variance, and accuracy of intuitive judgments

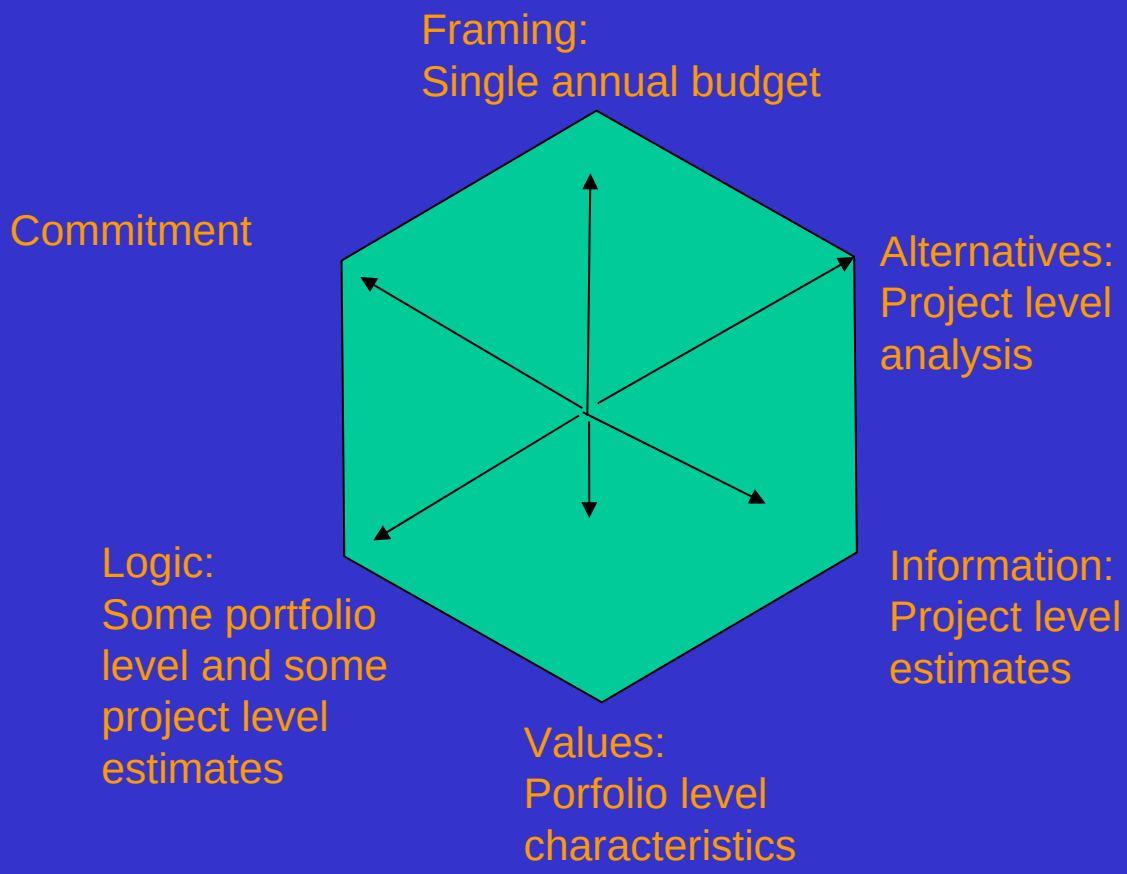
- Project benefit-to-cost ratios
- Project costs
- Returns to scale
- Prevalence of value and cost synergies ...

*Maybe quantitatively, but at least qualitatively



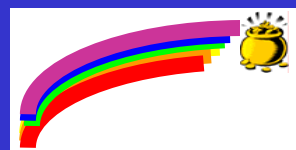
Then match the decision process' profile to the portfolio's needs

Example



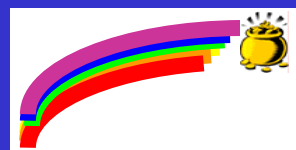
Efforts for portfolio decision quality should be consciously commissioned and planned

- Implement the profile in the form of the rules and flow of the decision process
  - Specify methods at this point
- May be best to customize process by business area, stage of development, etc.

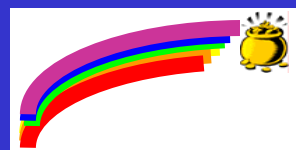


Conclusions

- Characterize portfolio before establishing a decision process
- Portfolio decision quality adds value, analogous to value-of-information
- Four levels of information
  - Focus efforts as appropriate
  - Consider shortcuts
- The “best practice” is to customize the process to the portfolio



Backup

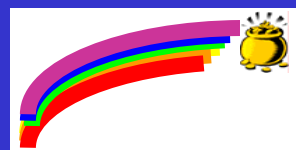


Logic: Consider synergies between projects

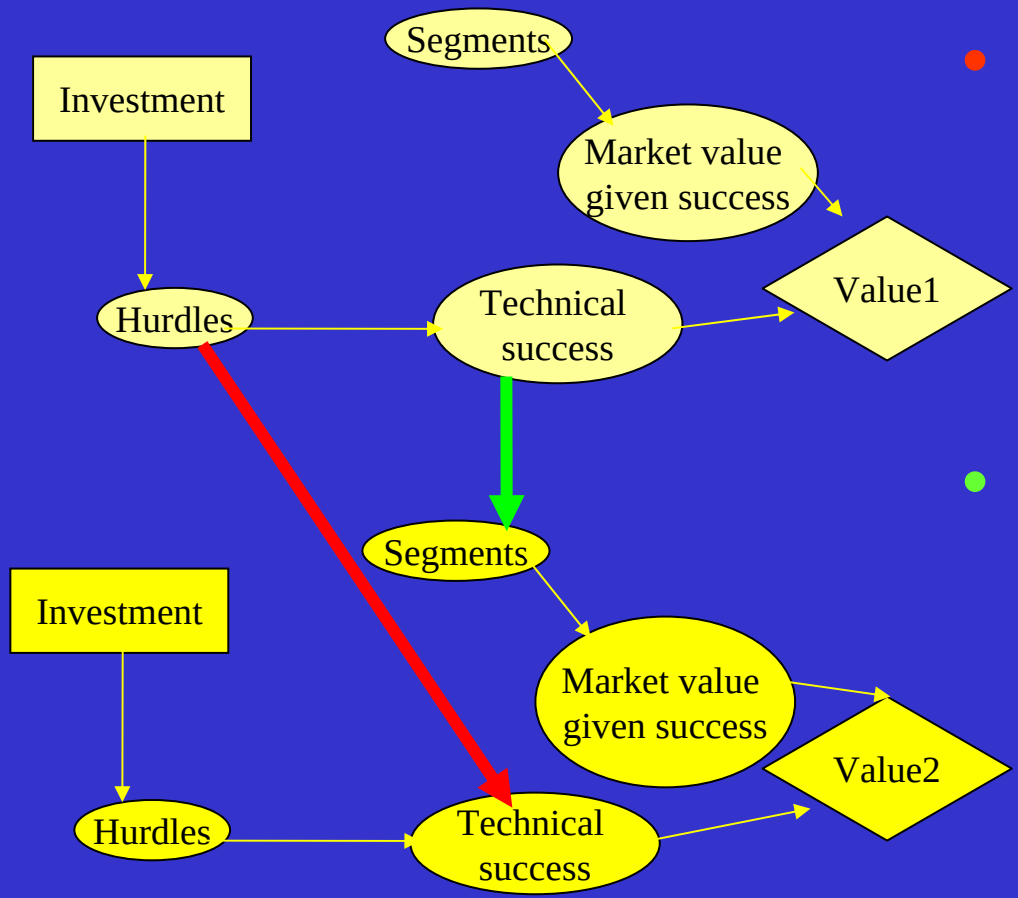
"It takes forever to consider all possible interactions between projects – let's just choose the most valuable ones"

vs.

"Strategy is about synergy, so leave no stone unturned"



Considering groups of projects helps to identify synergies



- Cost synergy: A is a technical hurdle for Project X and Project Y, but we only have to pay it off once.
- Value synergy: If product X and Y are available, then it is possible to sell to segment B.

What is perceived to be the most profitable set of projects depends on which synergies are considered

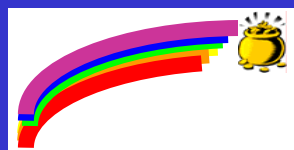
	Project					
Cost elements	A	B	C	D	COST	DONE
1	1	0	1	0	9.520143	1
2	0	1	1	1	**14.62838**	1
3	1	1	1	0	**13.11174**	1
4	0	0	0	0	19.90926	0
5	0	0	0	1	10.61151	0
Project Done?	1	1	0	0		

Revenue elements	1	2	3	4	Value	Value rec'd?
1	1	0	0	1	24.99826	0
2	0	0	1	0	26.28821	0
3	0	1	0	0	**27.55502**	1
4	1	0	0	0	39.89198	1
5	1	1	0	0	**27.38534**	1
6	0	1	0	X 1	33.35087	0
7	0	0	1	0	11.537	0
Project done?	1	1	0	0	94.83234	Net

These factors not considered in evaluating project B

Different ways to group projects for cost and value assessment

- Myopic: each project considered on its own.
- Speculative: give partial credit for possible synergies with related projects based on their overall prevalence
- Actual: if a pair or set of projects has a synergy, it is identified and considered

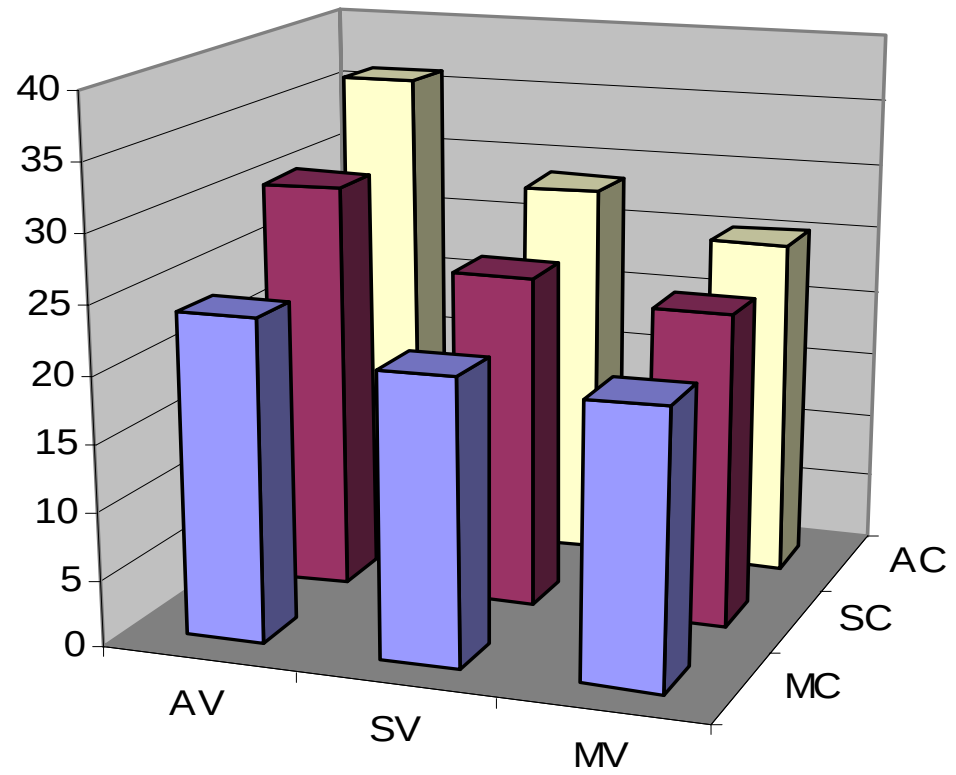


Results: Considering all synergies adds 77% to baseline

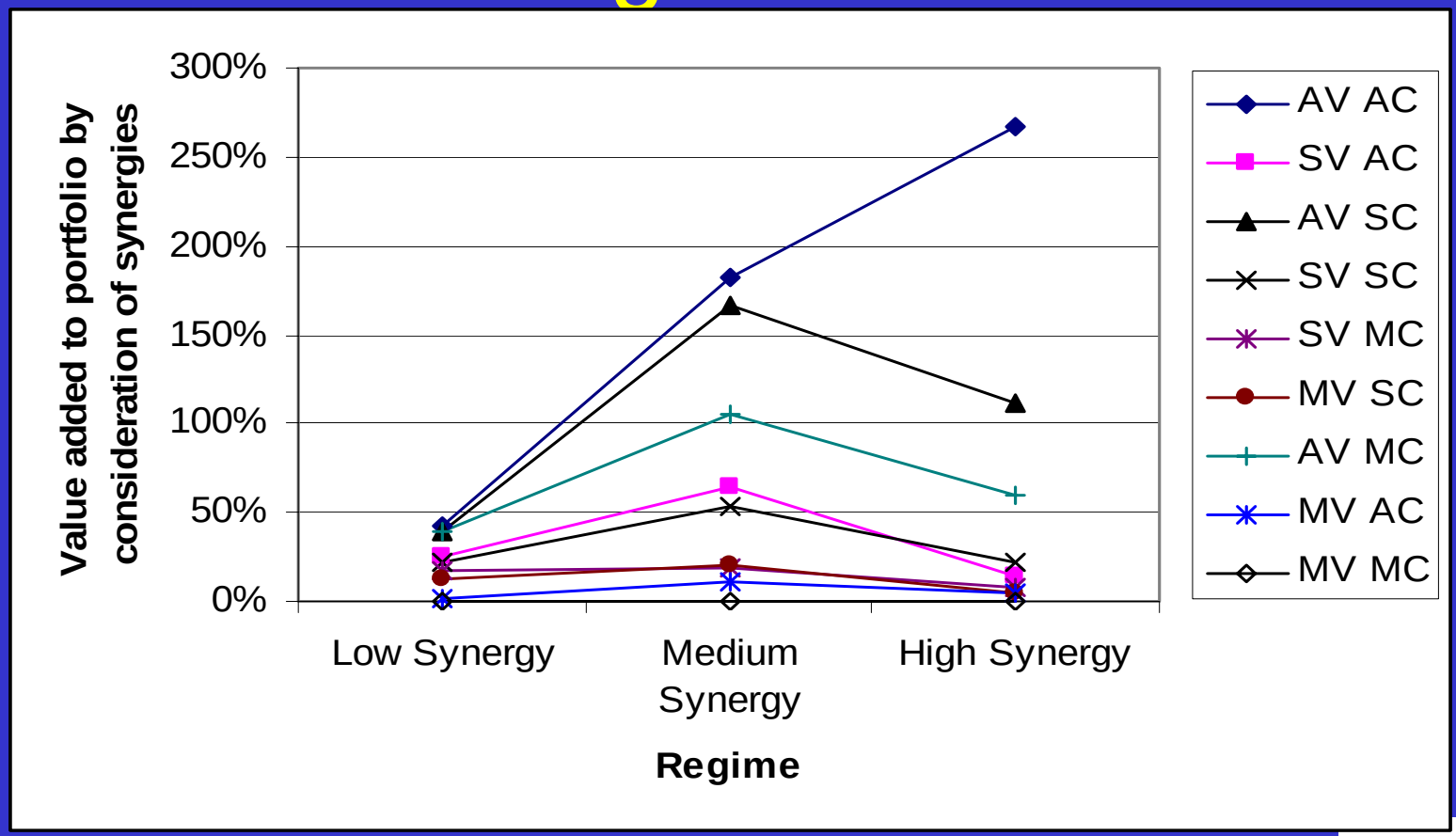
Key

MC: Myopic cost
SC: Speculative cost
AC: Actual cost

MV: Myopic value
SC: Speculative value
AV: Actual value



Sensitivity: When must synergies be tracked down, when can they be ignored?

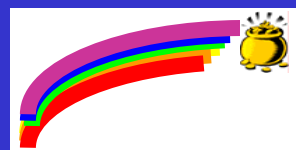


Values: Right measures

"People are trying to justify their projects without a compelling profitable business case"

Vs.

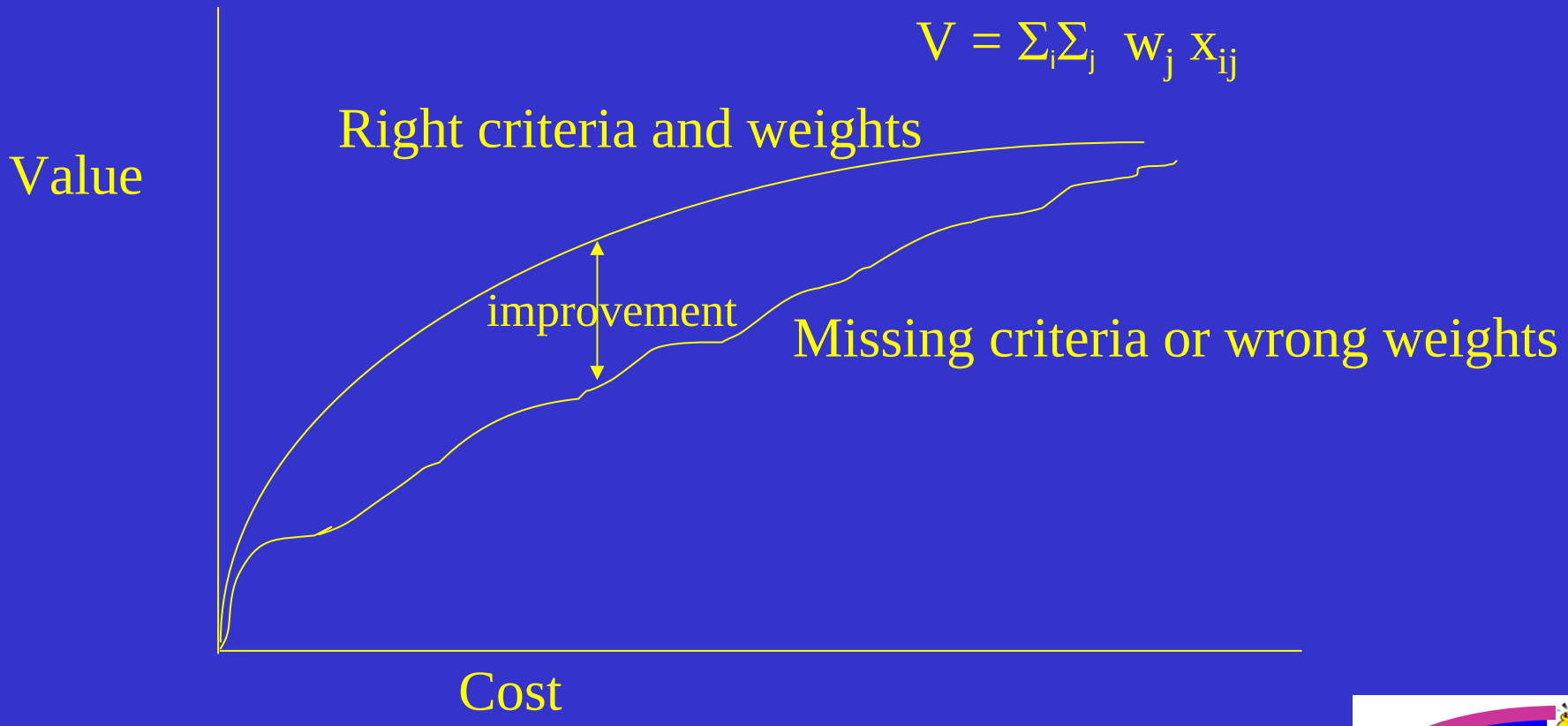
"NPV assumptions are never right and miss the strategic importance of my research"



How the right measures add value

- Other criteria proxy for expected impact on NPV when too little is known to make detailed models
- Important outcomes may never be reflected in NPV
- Examples: Innovativeness, medical need, difficulty, goodwill

Basic idea: With wrong weights and measures, low value projects may be funded before high value projects.



Quality means catching all the important criteria, rather than carefully weighting everything