

How to avoid disappointments in software projects (and life)

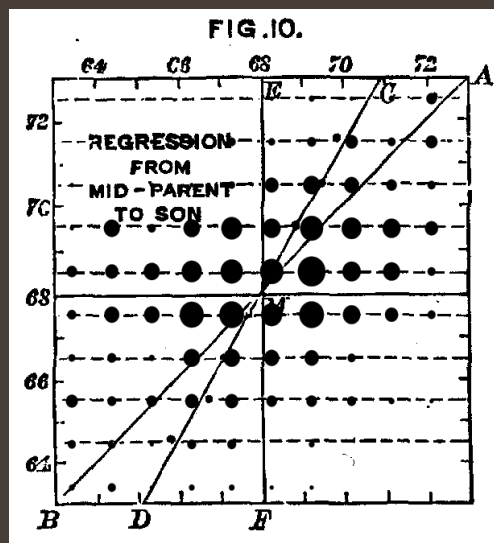
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Sir Francis Galton's law of "filial regression to mediocrity"

Shows that children of tall parents are expected to be lower than their parents.

If this regression was a biological force, all people would soon be average!



Natural inheritance.
 Francis Galton, London, Macmillan and company. 1899.

...and how can (by reversing the regression) parents of tall children at the same time be expected to be lower than their children!



NBA Finals: Spurs hope to break Sports Illustrated cover jinx



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The national media is showing the San Antonio Spurs some love in advance of the 2013 NBA Finals, which tip off on June 6.

Sports Illustrated has unveiled a cover for its June 10 issue titled: "The Biggest Three."

Sports Illustrated's Chris Ballard's writes in his accompanying story that "it's hard to argue" against proclaiming the Spurs' most talented core — Tim Duncan, Tony Parker and Manu Ginobili — as the most talented trio in NBA history.

Of course, three of the five SI writers who have predicted the outcome of these

Finals have picked the Miami Heat to



Enlarge
Sports Illustrated featured the Spurs' big men, Tim Duncan, Manu Ginobili and Tony Parker on the cover.

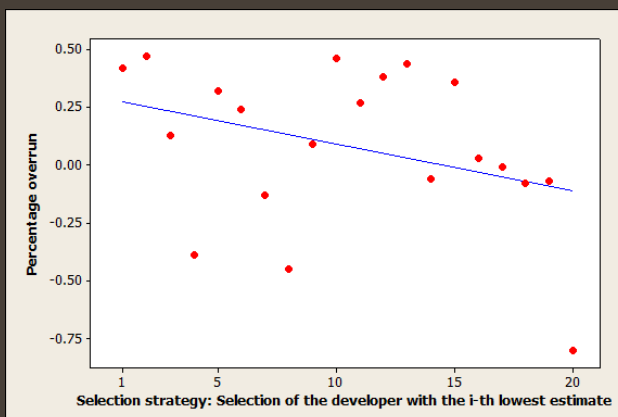
Beating
the Midas Curse

Why does hard work and financial success lead to disaster for so many families, and how can you save yours?

PERRY L. COHELL - RODNEY C. ZEEB

.... six out of ten affluent families will lose the family fortune by the end of the second generation.

The lower the effort estimate, the higher the risk of effort overrun (the winner's curse)



Study:
20 developers estimating and completing the same five tasks

M. Jørgensen. The Influence of Selection Bias on Effort Overruns in Software Development Projects, *Information and Software Technology* 55(9):1640-1650, 2013.

M. Jørgensen, A Strong Focus on Low Price When Selecting Software Providers Increases the Likelihood of Failure in Software Outsourcing Projects, EASE, Porto de Galinhas, 2013

A change from average bid price to a price 25% lower than average price of the selected bidder led to a 9% increase in probability of project failure, given the same level of company skill.



Study of almost 800.000 small scale projects at vworker.com

The winner's curse leading to a client's curse

Cancelled project or client score "poor" or worse

Mean client satisfaction score and failure rate on previous projects

Simplified explanations of regression towards the mean

The more extreme your performance, the more likely it is that you have had some luck (synonyms: random variance, noise, measurement error). You are not likely to repeat luck and will be more average next time.

The lower your estimate of cost compared to the others, the more likely it is that you have overlooked/misunderstood something or under-estimated the complexity.

A more formal description

Degree of
random
variation

Variance
shrinkage

$$\text{estimation overrun} = \frac{\text{act} - \text{est}}{\mu} = \frac{\mu \left(1 - \rho_{\text{est,act}} \frac{\sigma_{\text{act}}}{\sigma_{\text{est}}}\right) (1-w)}{\mu} = \left(1 - \rho_{\text{est,act}} \frac{\sigma_{\text{act}}}{\sigma_{\text{est}}}\right) (1-w)$$

Extremeness of
value

M. Jørgensen. The Influence of Selection Bias on Effort Overruns in Software Development Projects, Information and Software Technology 55(9):1640-1650, 2013.

Implication 1

Cost overrun is to a large extent caused by how the clients select providers

Situation with estimation uncertainty, many bidders and clients with focus on low price have misled us to believe that the software providers are more overoptimistic than they really are.

In-house software projects, where there is no provider selection bias, has on average no effort overruns. "Average price"-based provider selection strategies results in much lower cost overruns.

T. Halkjelsvik and M. Jørgensen. From origami to software development: A review of studies on judgment-based predictions of performance time, Psychological Bulletin, 138(2):238-271, 2012

Implication 2

The client should emphasize good skill, not low price when selecting a provider

Emphasis on low price leads to increased risk of selection of over-optimistic (the winner's curse) and less skilled providers (the Dunning-Kruger effect). It also makes a good provider performing worse.

The vworker.com data shows that the skill of the client is almost as important as the skill of the provider to predict project failure and a lack of correlation between provider skill and bid price.

M. Jørgensen. Failure Factors of Outsourced Software Projects, Submitted to a journal, 2013.

Implication 3

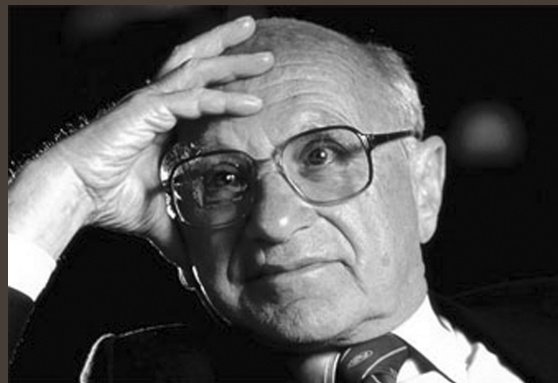
Low price bidders should only be selected when based on improved provider skill assessment methods

- An on-going analysis of vworker data suggests that:
 - Assessment of CVs, client satisfaction of previous clients and project proposal is typically not sufficient to know whether a low price is caused by high productivity, high over-optimism, lack of skill (Dunning-Kruger effect) or more “opportunistic behavior”
 - Ordinary skill tests (multiple-choice based) were not sufficient either
 - What seemed to work well to reduce risk were large realistic tests (previous projects) and the use of “trialsourcing”

Possible discussion topics:

- Why are software clients neglecting the winner's curse and other regression towards the mean phenomena?
- What should software providers do to avoid the winner's curse?
- How feasible is it to implement alternative provider selection methods such as trialsourcing and realistic tests of software providers?
- Other topics?

Milton Friedman
(Nobel prize
winner in
economy)
once wrote:



"I suspect that the regression fallacy is the most common fallacy in the statistical analysis of economic data".

All previous observations are caused by the same statistical (but nevertheless real-world) phenomenon

Regression towards the mean

Proposal sent to Tom

Time: 20 min presentation + 30 minutes discussion

TOPIC: The winner's curse, moral hazard and the increase in failure risk with emphasis on low price when selecting a software provider

PRESENTATION DETAILS: The following three situations surprise most people, or they explain them incorrectly:

- i) The rookie of the year is likely to perform disappointingly the following year.
- ii) Your children are likely to disappoint you with respect to their performance on things you are exceptionally good at.
- iii) Software providers selected based on low price are those most likely to be strongly over-optimistic about cost and complexity of the project (and also less skilled). The situations have the same underlying reason, which is statistical in nature and discovered by Sir Francis Galton during the late 19th century. I will explain the relevant statistical phenomenon, why it is so easy to neglect it, and present results from empirical studies showing how much a strong focus on lowest price when selecting providers increases risk of project failure. The key to reduce this problem is mainly in the hands of the software clients, who should replace the traditional bidding rounds with more proper selection mechanisms. I recommend the use of and present empirical results on the decrease in failure rate when applying "trialsourcing" in an outsourcing context, i.e., skill evaluation and selection of providers based on a delivery of an increment of the desired software system.

DISCUSSION TOPICS:

Why is this effect (winner's curse) not seen and taken care of to avoid the adverse effects?
The awareness is so much lower than in many other domains, while effect is higher in software engineering due to higher cost uncertainty.

My data on trialsourcing is from small projects. In addition, there are some cases (non-controlled environment) from larger scale projects. Are there other experiences, empirical data that contradict the positive effect of trial sourcing, e.g., higher cost without better selection ability?

Are there additional good arguments to use (and not to use) trialsourcing? After all, trialsourcing is hardly a new approach.

There are other provider selection and planning approaches that solves the problems related to emphasis on low price when there is high uncertainty in actual cost and complexity differently, e.g., through not having up-front budgets and cost estimates. To what extent are clients willing to use such approaches?, e.g., to accept that they "don't know the price" when they start a large software project.