

# Dilbert-Peter model of organization effectiveness: computer simulations

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# Peter principle

- Laurence Peter (1969): „In a hierarchy every employee tends to rise to his level of incompetence”
  - Employees are promoted so long as they work competently. Sooner or later they are promoted to a position at which they are no longer competent (their "level of incompetence"), and there they remain, being unable to earn further promotions.
  - PLUCHINO, A., RAPISARDA, A. & GAROFALO, C. (2010). The Peter Principle revisited: A computational study.

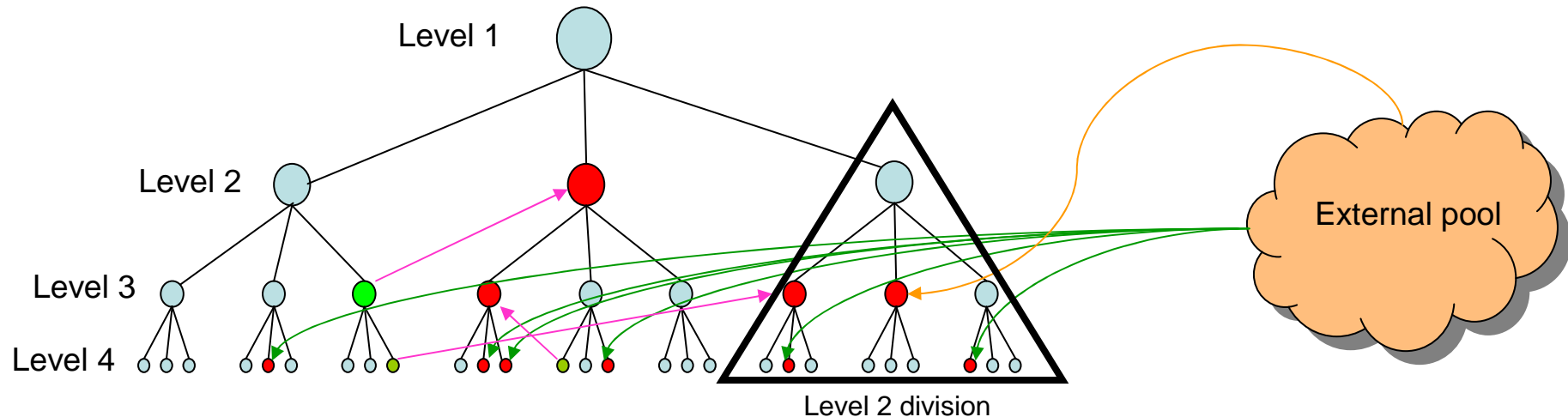


Ig-Nobel Prize 2010 for Management  
for  
demonstrating mathematically that organizations would become more efficient if promotions  
were made at random

## Dilbert principle

- Scott Adams (1996) Dilbert Principle:
  - „Incompetent workers are promoted directly to management, without ever passing through temporary competence stage” (named after Dilbert comic strip)
- Comparison of consequences of the two principles:
  - According to Peter, your boss may be incompetent at HIS job, but at least you could be sure he was competent at yours, *because* he was promoted
  - According to Dilbert, your boss is incompetent today, and was before his promotion
- Both principles lead to decrease in hierarchical organization productivity
- Question: why would organizations fall into Dilbert trap?
  - Because promotion goes not to the best workers, **but to those who APPEAR to be the best...**

# What we model: general hierarchical structure



- We assume that horizontally the tasks are the same among all divisions (this describes, for example, geographical sales organization in a large corporation)
- Worst performers at each level are fired
- Best performers are promoted to the higher level (or someone is hired from other companies to fill the vacancy)

## Computer model: general description

- Simulated organization in which every `agent' acts to maximize his chances of promotion.
  - We divide the efforts of the agents into `real work' and self promotion. The latter turns the real productivity into **perceived productivity**
  - Agents are characterized by two separate parameters: skill  $w_i$  and self promotion  $p_i$
  - Because of limited resources, the more time is spent on self promotion, the less time is spent on real work – diminishing effective productivity  $w'_i = w_i - p_i$
  - Promotions are based on **perceived** productivity
  - Company results are based on the **real** one...
- Thus, while individuals will aim at improving their positions, the company results would fall...

## Computer model: general description (cont.)

- Additionally we use a novel approach in which manager's contribution is multiplicative rather than additive.
  - This is to describe situations in which a bad manager can decrease the productivity of his team...
  - Effective results of agent  $i$  are given by his real work and results of all subordinates

$$W_i = w'_i \times \left( \sum_{j \in SUB(i)} W_j \right)$$

- Promotion/firing depends on comparison of normalized effective results modified by the susceptibility to self promoting efforts

$$U_i = W_i / \overline{W(k)} + C \cdot p_i$$

## Discontinuity of tasks: sales teams

- In many situations the skills used at a lower level are insufficient at a higher level of the hierarchy
  - Junior salesman: *helper, participation in easy sales*
  - Salesman: *large sales, account management, tactics*
  - Sales Manager: *planning campaigns, monitoring salespeople and goals*
  - Regional Sales Manager: *coordinating teams, setting goals, planning marketing*
  - Sales Director: *choosing strategies, setting general goals and policies*
  - CEO: *choosing directions, defining financial model*
- Two simulated scenarios:
  - **continuity model** (productivity at higher level is close to the one at the lower level)  $w_i^+ = w_i + \delta w$
  - **Peter model** (productivity at higher level  $w_i^+$  is random, uncorrelated with previous one)
  - Self promotion  $p_i$  is preserved throughout the career

## Sales teams – measuring the results

- Measuring true results of a salesperson seems easy, compared to other professions:
  - it seems to be made of objective numbers – how much you sell...
  - and seems directly related to company results: revenue, margin...
- But there are so many methods used in reality:
  - Profit generated by salesperson
  - Revenue paid by the customer
  - Revenue invoiced
  - Order amount
  - Key wins
  - Order/revenue growth vs previous year
  - Soft targets: market position etc.
- And all of results are relative to the target
  - setting the target is a political game within the company
- Lastly: for external hires: it is ALL based on perception...



## Simulation results

- We simulated 5 level organization of medium size
- Top level manager stays fixed  $w_1 = 1$ , and  $p_1 = 0$  (random changes at this position grossly influence the results)
- We monitor averages of  $\langle p_i \rangle_k$  and  $\langle w_i \rangle_k$  for each level of hierarchy as functions of time (promotion/firing cycle is done in quarters)
- Main control parameters are: continuity vs Peter assumptions for skills usability after promotion and susceptibility to self promotion,  $C$ .
- For small values of susceptibility  $C$ , self promotion is selected against, high levels of hierarchy show low values of  $\langle p_i \rangle_k$
- For large susceptibility self promotion pays off and high levels are filled with agents with high  $p_i$

## Simulation results, continued

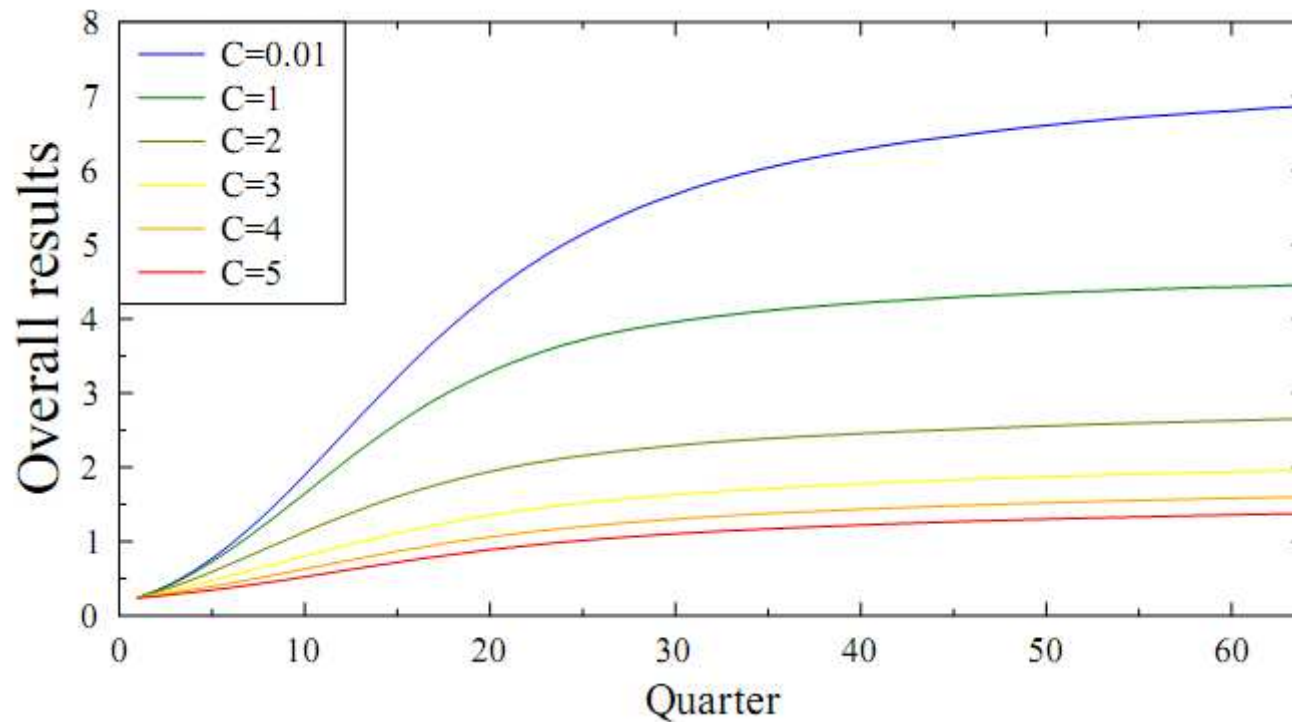
- For Peter model average skills  $\langle w_i \rangle_k$  do not improve with time
- For continuity model, as the best workers who are promoted retain their capabilities,  $\langle w_i \rangle_k$  increase with time
- Evolution of distribution of  $\langle w_i \rangle_k$  and  $\langle p_i \rangle_k$  happens simultaneously and both are well described by exponentials

$$w(t) \approx w_{max} + (w_0 - w_{max}) \exp(-t/T_w),$$

$$p(t) \approx p_{max} + (p_0 - p_{max}) \exp(-t/T_p).$$

## General productivity evolution

- **Continuity** model, starting from random distributions of agent characteristics



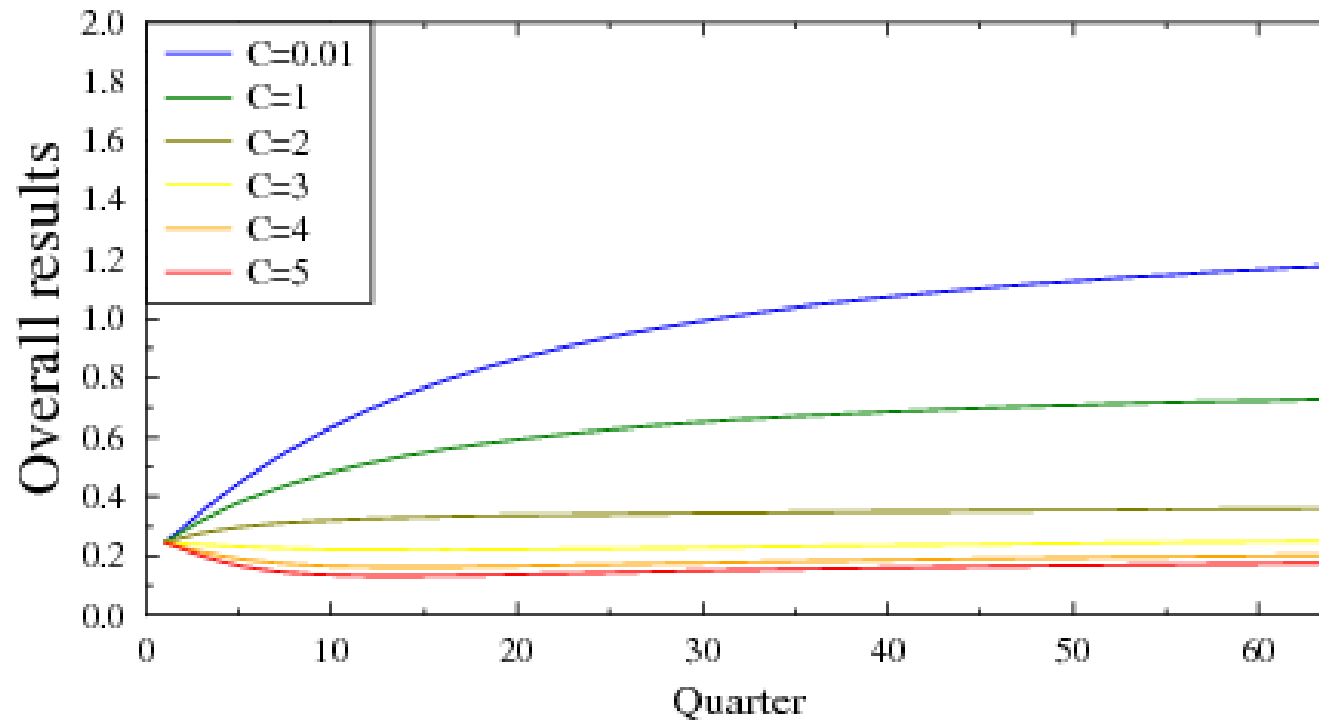
Results are measured relative to `neutral' organization, where all agents have

$$p_i = 0$$

$$w'_i = w_i = 1$$

## General productivity evolution

- **Peter** model, starting from random distributions of agent characteristics

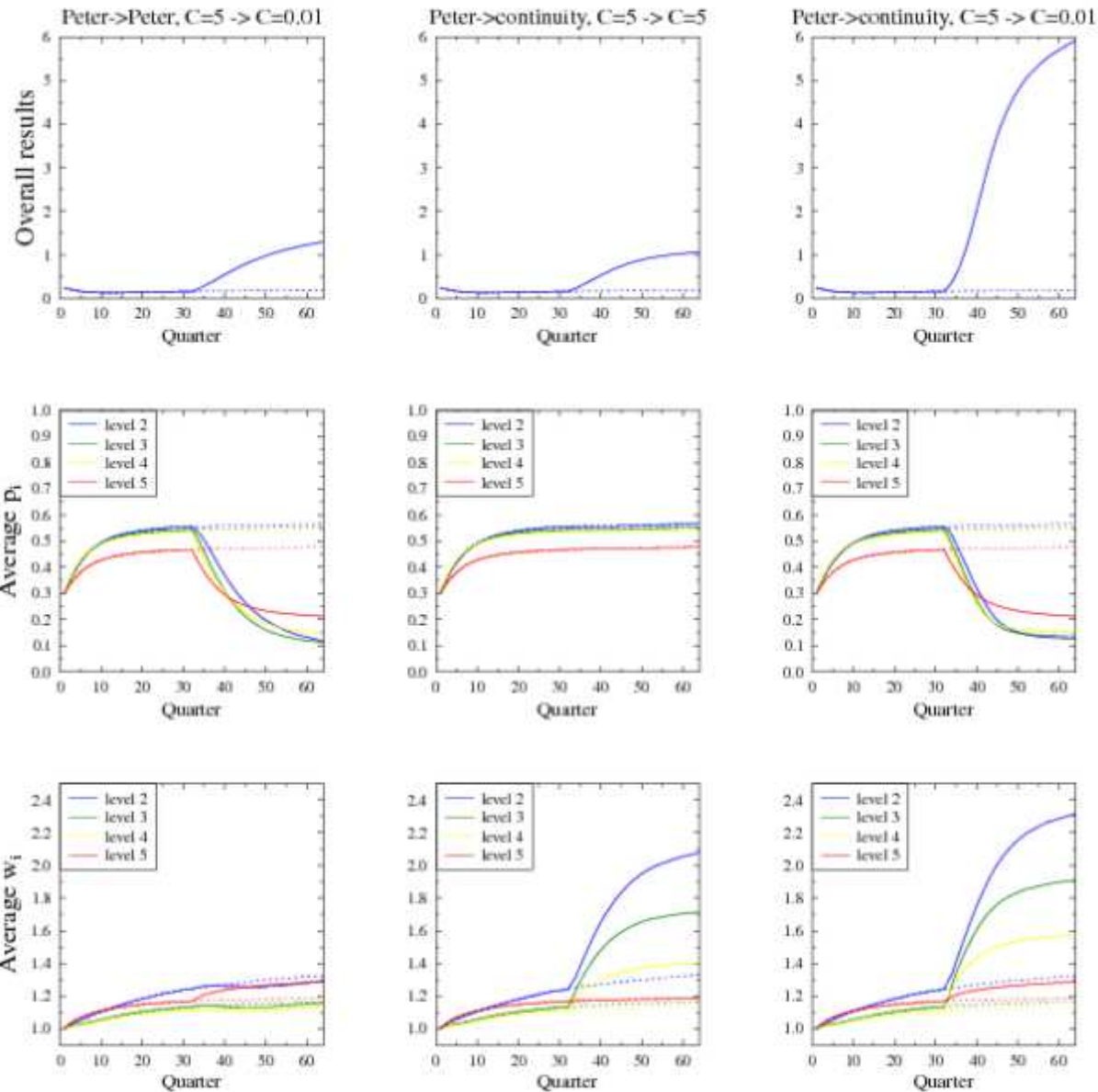


Note: For high  $C$  the results are worse than the 'neutral' organization ( $W=1$ ), even worse than random organization ( $W=0.3$ )!

## Can anything be done?

- Yes, for example one can:
  - Prepare candidates for promotion for the tasks at higher level (to escape the Peter trap)
  - Keep susceptibility to self promotion low (by mechanisms focusing on real results)
- Can we simulate such changes?
- What would be the timescale and value of improvement of total productivity?
  
- Simulation: after 8 years a badly run company (Peter policy and large susceptibility) changes the policies for better:
  - going from Peter to continuity model,
  - decreasing  $C$  from 5 to 0.01
  - or both.

# Improving the situation: results



# Conclusions

- Is this real phenomenon?
  - Yes, it is. Salesperson key skill lies in presenting reality to the customer in a way to achieve desired results (sale).  
Is it surprising that they use the skills **within** their own companies?
- Is it present in other domains?
  - Think about doctors, team leaders, ward managers, hospital managers, members of parliament, health ministers...
- Is there similar **natural** phenomenon?
  - Yes, cheating in evolutionary selective processes (e.g. males influencing female choice of a mate). Nature's solution: **make signalling truly costly** (posing as attractive should be as costly as being valuable), to lower system susceptibility.
- Can we learn from nature?
  - Partially yes, but remember, evolution has blind alleys as well (think peacocks).
- Less important factors included in the model (omitted from presentation)
  - Blameshifting: badly performing boss (faced with being fired) may shift the blame on subordinates (small negative impact on productivity); pre-screening of external candidates (small positive impact)
- What is not included in the model:
  - Improvement of skills with time and training; growing organizations; non-uniform organizations and cross-functional promotions (sales → marketing etc.)

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