



# Discussion of Stan Metcalfe's The Evolution of Industrial Dynamics

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# Industrial dynamics, Metcalfe and DRUID

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- Schumpeter in 1949
  - "nobody seems to understand or even to care precisely how industries and individual firms raise and fall and how their raise and fall affects the aggregates"
- Today we have lots of data but not full concepts
- Metcalfe in the pre-DRUID period
  - Industry studies needs "a hell of a lot of sharpening up"
- Metcalfe's paper (<http://www.druid.dk/ocs/viewabstract.php?id=605&cf=3>)
  - Sharpening of the analysis of industrial dynamics
  - The beginnings of a book on the foundations of evolutionary analysis?



# Capitalist industrial dynamics

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- The vision
  - Resting capitalism is dead capitalism
  - Capitalism is a restless process of industrial experimentation and selection
- The analytical approach
  - Study spontaneous transformation
  - Use statistically oriented models
- The complexity of the capitalist process
  - Imperfect markets for products, labour, and capital
  - Organisational levels of firms, plants, and work groups
  - Selection between units and innovation within units, entry and exit, mergers and fissions



# Accounting for industrial dynamics

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- R.A. Fisher's equation
  - The dynamics of selection based on variance
- George Price's equation:
  - Change in aggregate performance  $\equiv$   
    'Selection' effect + 'Innovation' effect
  - The 'innovation' effect sustains industrial dynamics
- The accounting system allows a study of some complexities of industrial dynamics
  - E.g. by multi-level selection and inclusion of exit
- Metcalfe uses the system to sharpen four literatures
- But how good is it for handling complex dynamics?



# 1. Change in aggregate productivity

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- The productivity literature studies heterogeneous populations
- The results differ wildly
- Differences are due to different accounting systems



## Productivity effects, Canada 1988-1997

(% contribution to labour productivity growth)

	Baldwin	Haltiwanger
Entry and exit	14	18
Reallocation among continuing firms	47	-5
Changes within continuing firms	39	98
Covariance of effects of continuing firms		-22
Total	100	100

Baldwin, John R. and Gu, Wulong (2004), Industrial competition, shifts in market share and productivity growth, *Economic Analysis Research Papers*, #21, Ottawa: Statistics Canada, pp. 15, 17.



# Metcalfe's interpretation

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- Accounting for the difference
  - Contribution to 'selection' effect =  
(distance from mean productivity) ×  
(change in market share *or* change in employment share)
  - Very restrictive assumptions needed to remove the difference
- Explaining the difference (see Metcalfe, 1997!)
  - The firm is facing imperfect markets for output and factors
  - We need complementary accounting methods
- Problem: accounting for the 'innovation' effect
  - Partly within-firm selection effects handled by Price's Equation
  - Partly real innovation efforts that must interact with selection
  - How to handle these issues in general?



## 2. The industry life cycle

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- Largely an empirical story of entry and exit
  - Initially easy entry to the new industry
  - Then a major exit event (the 'shakeout')
  - Finally a relatively stable oligopoly
- Explanations differ, but they study heterogeneity
  - They should include both output and factor markets
  - Government should rule against anti-entry contracts
- My proposal in relation to Klepper's work
  - Consider each pioneer firm and its spin-offs together
  - Use Price's equation to compare this contribution with e.g. that of inexperienced entrants
  - Is this proposal relevant?



## 3. The differential growth of firms

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- The topic is at the core of population dynamics
- Challenge: very weak selection is often found
- Stan's solution (1)
  - Noise matters, but so does selection
  - There are many selection criteria in industrial dynamics
  - Trade-off between different criteria
    - E.g. productivity and product quality
  - Difference for small innovators and large incumbents
- Stan's solution (2)
  - Flexible use of the tools and the vision of capitalism
- Missing: a major example and its clarification



## 4. The macro effects of the logistic growth of firms

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- Clarifying the old literature on retardation of growth
  - Study the variance of the growth rates of existing industries
  - Mean growth rate changes negatively and is equal to variance
  - This is the retardation theory
- Consequence for the structure of the economy
  - The share of each industry follows a modified logistic curve: expansion is followed by contraction
  - The structure of the capitalist economy is restless
- Can the result be stated in traditional macro terms?



## Conclusions

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- The tools clarify many issues of industrial dynamics
- The tools give an understanding of restless capitalism
- The tools might be applied to handle the negative consequences of creative destruction
- An extension and pedagogical presentation of Metcalfe's analyses are needed