## Econophysics: challenges and promises

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## Contents:

- An introductory example taken from physics:
- The so-called "free" fall comprises two effects: gravity + drag
- Resolving multifaceted phenomena into simple effects
- Two illustrations:
- Financial crisis (2007): leverage + failure of rating agencies +?
- Suicide of bachelors: why Chinese Americans are an ideal laboratory
- "Brain storming" discussion (at least 40 mn )



## Percentage of experimental/theoretical papers published in Physical Review.

If the current trend continues, experimental papers will represent only $20 \%$ by 2050.


## Resolution of the fall of an apple into "elementary" effects



Title: Driving Forces in Physical, Biological and Socioeconomic Phenomena
Subtitle: A Network Science Investigation of Social Bonds and Interactions
Cambridge University Press, May 2007, 254 pages
Copies of any chapter can be downloaded from my website (in MS form)
http://www.lpthe.jussieu.fr/ roehner

# Table 1 Influence of marital ties on suicide rates 

(chapter 9 of "Driving Forces")

|  | Time interval | Country | Males | Females |
| :--- | :--- | :--- | :--- | :--- |
|  |  | Ratio of <br> suicide rates: <br> unmarried/married | Ratio of <br> suicide rates: <br> unmarried/married |  |
| 1 | $1889-1891$ | France | $2.80 \pm 0.23$ | $1.56 \pm 0.43$ |
| 2 | $1881-1890$ | Switzerland | $1.66 \pm 0.24$ | $1.34 \pm 0.41$ |
| 3 | $1911-1920$ | Norway | $2.56 \pm 0.83$ | $2.18 \pm 1.21$ |
| 4 | $1968-1978$ | France | $2.69 \pm 0.66$ | $2.24 \pm 1.10$ |
| 5 | $1970-1985$ | Norway |  | $1.78 \pm 0.24$ |
| 6 | $1981-1993$ | France | $2.34 \pm 0.33$ | $2.15 \pm 0.91$ |
| 7 | $1982-1996$ | Britain | $1.44 \pm 0.12$ | $1.27 \pm 0.20$ |
| 8 | $1990-1992$ | Queensland | $2.67 \pm 1.20$ | $2.11 \pm 1.60$ |
| 9 | $1998-1998$ | Australia | 2.21 | 2.00 |
|  |  | Average | $2.30 \pm 0.24$ | $1.85 \pm 0.32$ |

Sources: 1: Durkheim (1897); 2: Halbwachs (1930); 3: Statistiske Centralbyrå (1926, table 22); 4: Besnard (1997); 5: Høyer et al. (1993); 6: Besnard (1997); 7: Kelly and Bunting (1998, Fig. 4); 8: Cantor et al. (1995); 9: Steenkamp et al. (2000).

## Two problems:

- Substantial fluctuations in time and across countries (>20\%)
- Does marriage select those people who are less inclined to suicide?


Suicide rate as a function of sex ratio.
Left-hand side: 1926, Right-hand side: 1960.
Sources: Mortality Statitics, Vital Statistics of the United States, various years.


## Financial chain for financing mortgage loans.

The required capital moves from right to left whereas the debt as well as interest payments move from left to right.


## Resolution of the financial chain of the loan crisis into "elementary" effects.

Although the analysis of these different effects requires a great deal of work and perseverance there is no major obstacle to be foreseen. This suggests that we have here a complicated system but not a complex system in the sense this word has when one says that a cell with its genetic code is a complex system.

