### **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)** 

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	Time interval	Country	Males	Females
			Ratio of	Ratio of
			suicide rates:	suicide rates:
			unmarried/married	unmarried/married
1	1889 - 1891	France	2.80 ±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	$2.56{\scriptstyle~\pm 0.83}$	$2.18 \pm 1.21$
4	1968 - 1978	France	$2.69{\scriptstyle~\pm 0.66}$	$2.24 \pm 1.10$
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 ±0.24	1.85 ±0.32

#### Table 1Influence of marital ties on suicide rates

(chapter 9 of "Driving Forces")

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.