Distributional properties, Financial Constraints and Firm Dynamics

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Economic announces on Japan

CNN Money, May, 20 2015 *"Gross domestic product grew by an annualized 2.4% in the three months ended March, Japan's Cabinet Office said Monday. The figures were better than what most experts were expecting, and stronger than last quarter's growth."*

International Business Times, July, 23 2015 *"Japan Economic Outlook 2015: Economists Forecast Q4 GDP To Expand 3.7%, Economic Growth To Increase 0.6% in 2015"*

OECD Economic Survey Japan 2015


OECD Economic Surveys
JAPAN
APRIL 2015
OVERVIEW
OECD
BETTER POLICIES FOR BETTER LIVES

- Japan's [public] debt is the highest in the OECD, pushing up debt service costs
- Japan faces a problem of high poverty (more than 16% vs. OECD average of below 12%)
- The impact of taxes and transfers on income inequality and poverty is weak in Japan
- There are large income gaps between regular and non-regular workers

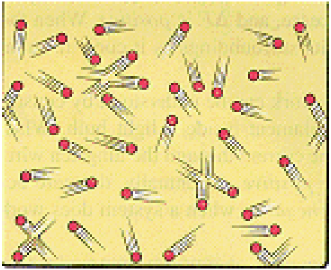
Representative Individuals and central tendency

Classic economics: story with stylized characters (like ancient Rome or Noh theater): farmer, worker, capitalist, rentier,. . .

Modern economics: more formalized but the idea of "representative individual" is still pervasive (notwithstanding the theoretical relevance of differences in endowment, capabilities, preferences and believes).

On the empirical size, it is prominent the notion of "central tendency" and the reliance on average behavior.

Kinetic Theory of Gas



Molecules move in all directions. Taking the averages...

Representative molecule does not move

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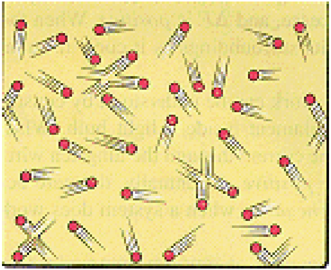

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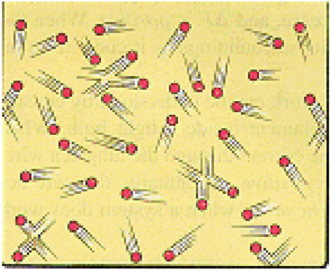

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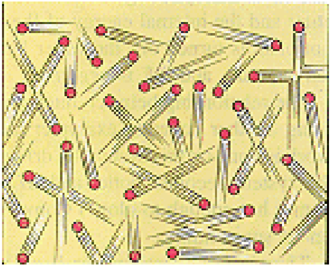
Increasing the temperature



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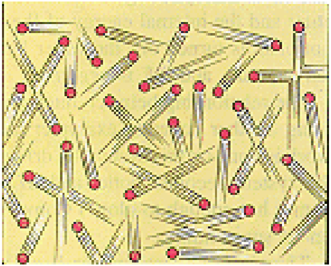

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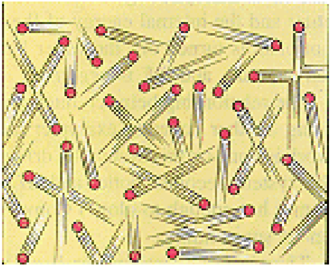

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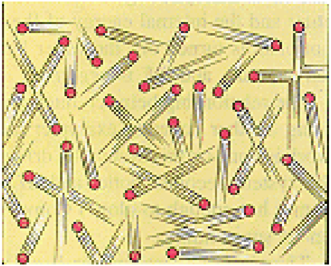

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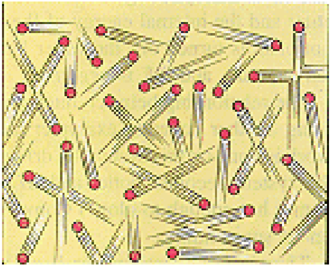

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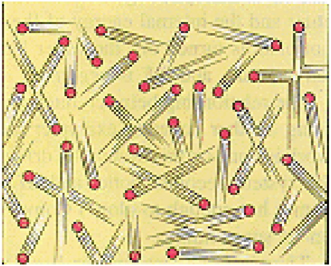

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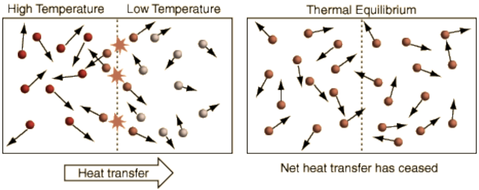
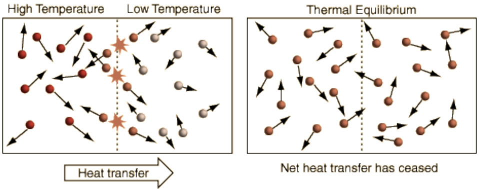
Transfer of heat



Two different populations of molecules transfer heat ...

Representative molecules in both population remain motionless

Transfer of heat



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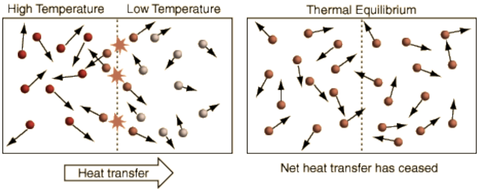

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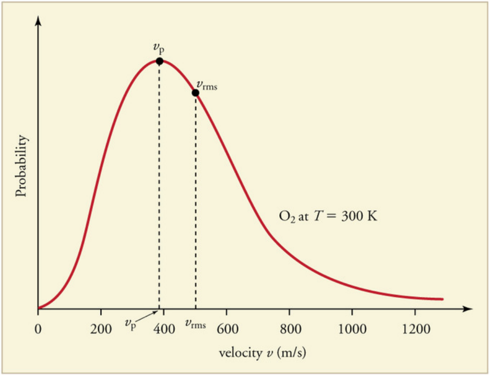
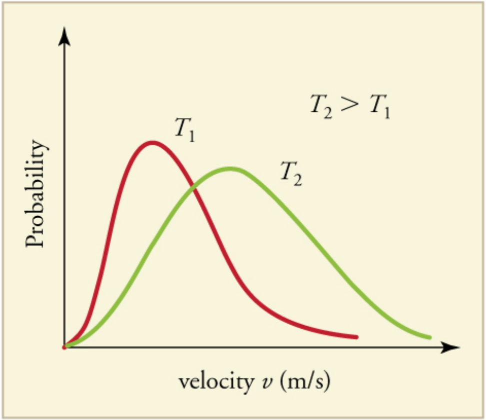
Distribution of speed



Better description through the distribution of speed.

Distribution of speed



The effect of temperature is now nicely visible

Financial constraints are difficult to measure . . .

Some degree of difficulty in finding the financial resources necessary to pursue the desired business plan.

$165,000$ *limited liability* Italian manufacturing firms, classified according to CEBI (official) solvency ratings:

Three FC classes:

- Non Financially Constrained (NFC)
- Mildly Financially Constrained (MFC)
- Highly Financially Constrained (HFC)

. . . but they are important

FC affect:

- investment/divestment decisions
- decision to expand production or entering new markets
- cash management
- R&D policies

Qualitative evidence on reaction to crises suggests heterogenous impact of FC:

- "Pinioning" effect: firms facing good opportunities tend to bypass attractive investment projects
- "Loss reinforcing" effect: firms facing poor growth opportunities display higher propensity to sell off productive assets to generate funds, further deteriorating growth prospects

FC and distribution of economic variables

from *Productivity, Profitability and Financial Performance* by Bottazzi, Secchi and Tamagni, ICC 2008

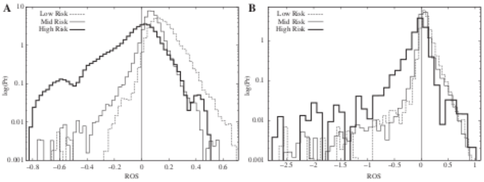


Figure 2 Empirical density of ROS in 2002 for the manufacturing (**A**) and service (**B**) industry.

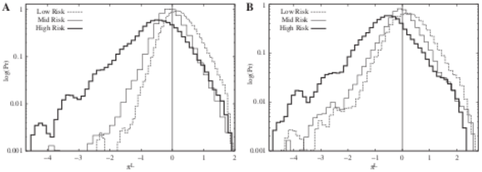
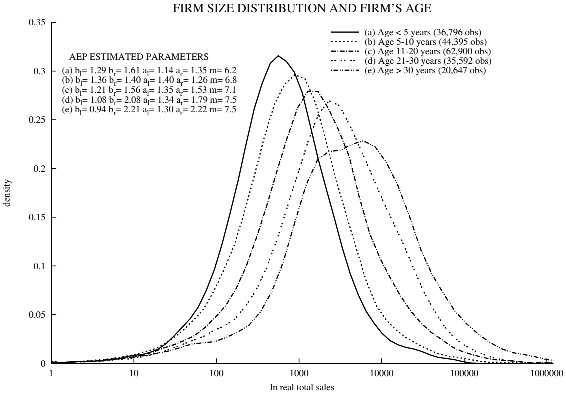


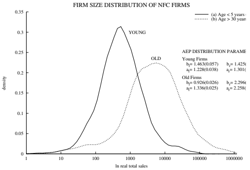
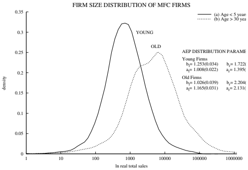
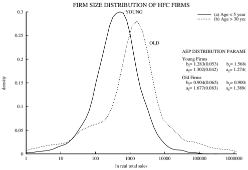
Figure 4 Empirical density of labor productivity differentials in 2002 for the manufacturing (**A**) and service (**B**) industry. Labor productivity is defined as VA/L.

The evolution of the size distribution

from *Financial Constraints and firm dynamics* by Bottazzi, Secchi and Tamagni, SBE 2014



Size distribution and financial constraints

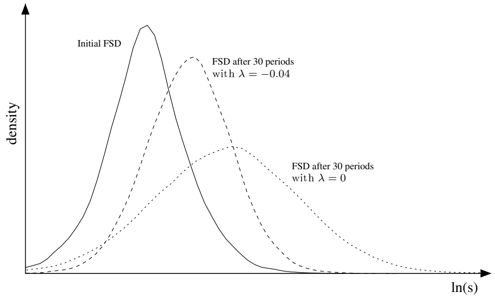
NFC	MFC	HFC
		

FSD evolution depends on the FC class:

- shift in the central location, smaller for the HFC class
- variance increases for NFC and MFC, less for HFC See stats
- right-tail tends to Gaussian for NFC and MFC, not for HFC (confirmed by Asymmetric Power Exponential(AEP) estimates)

FCs and persistence of growth

Growth persistence, captured by different values of the auto-correlation coefficient λ, affect the evolution of the size distribution.

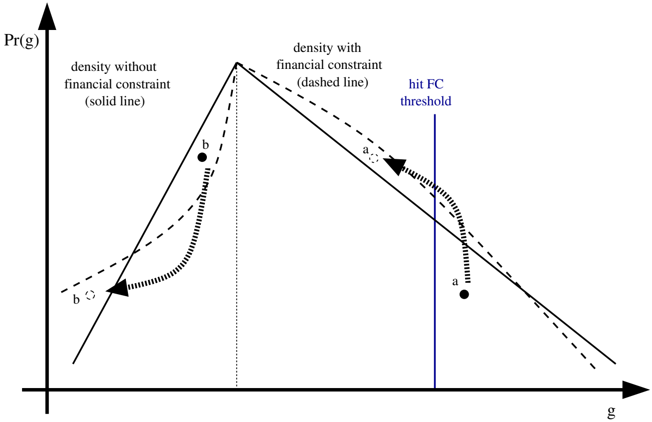


Departure from Log-normality for the most severely constrained firms.

FCs and the distribution of growth rates

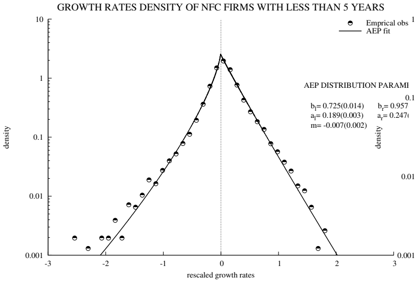
Qualitative evidence: “pinioning” and “loss reinforcing”

ASYMMETRIC DISTRIBUTIONAL EFFECT

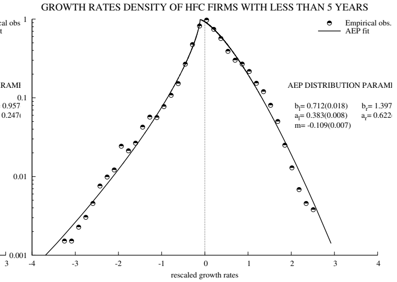


Growth rates by FC class: young firms

YOUNG NFC



YOUNG HFC

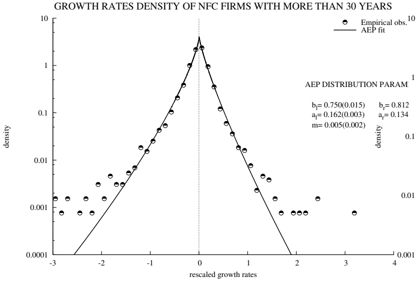


For younger firms, strong FCs :

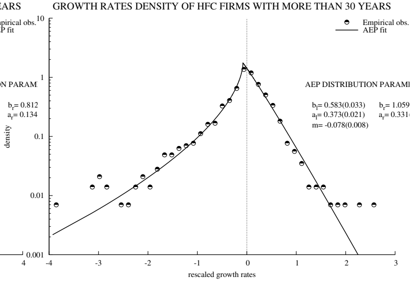
- slim down the right tail of the distribution, i.e. shift of probability mass from the tail to the central part of the distribution
- do not seem to have an effect on the left half

Growth rates by FC class: old firms

OLD NFC



OLD HFC



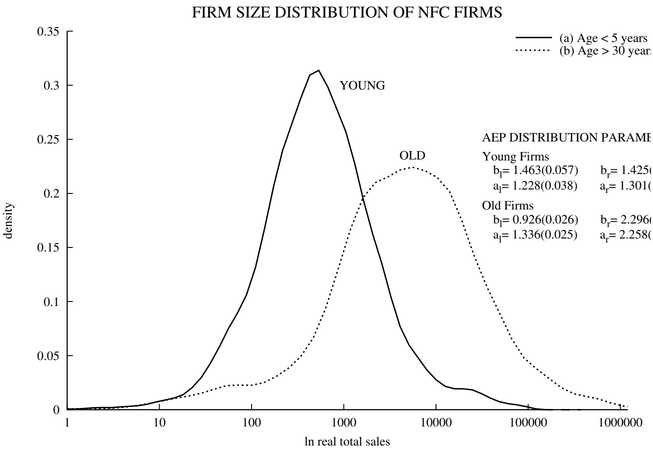
For old firms, strong FCs:

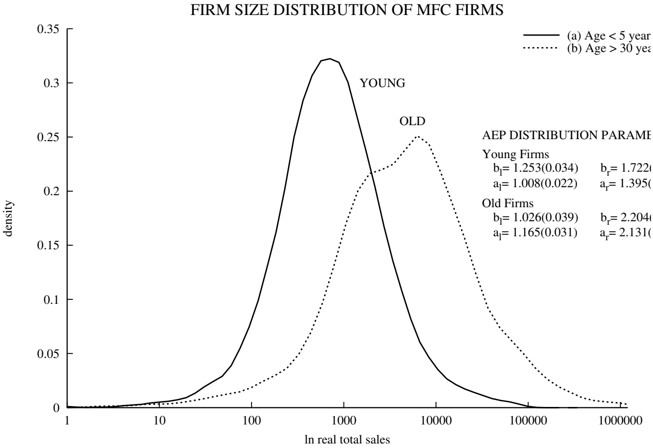
- imply a very mild slim down of the right tail
- fatten up the left tail of the distribution, i.e. shift of probability mass from the central part to the tail of the distribution

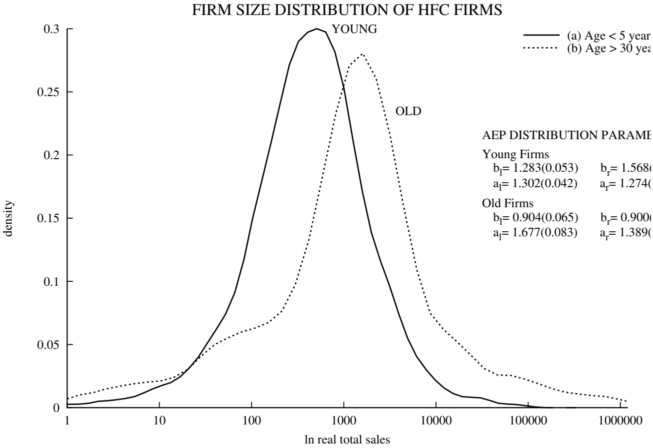
Conclusion

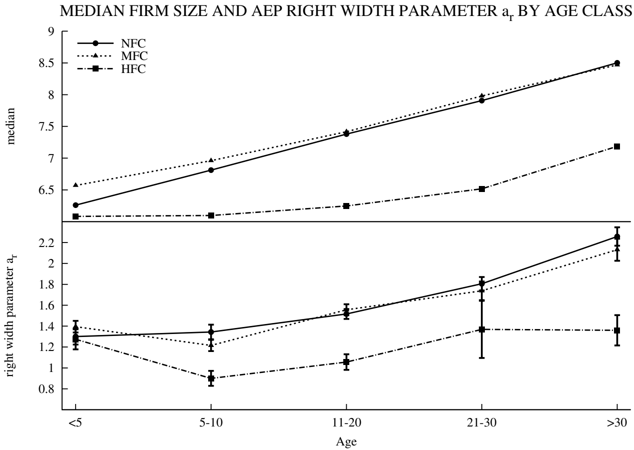
- FC has a large impact on firms dynamics.
- In order to identify their effect, however, one has to look beyond central tendency measures.
- The tightening of credit has perhaps a positive effect on older firms, but surely a negative one on the youngest.

ご清聴ありがとうございました


FIRM SIZE DISTRIBUTION OF NFC FIRMS
(a) Age < 5 years
(b) Age > 30 year
YOUNG
OLD
AEP DISTRIBUTION PARAME
Young Firms
b_l= 1.463(0.057) b_r= 1.425
a_l= 1.228(0.038) a_r= 1.301(
Old Firms
b_l= 0.926(0.026) b_r= 2.296
a_l= 1.336(0.025) a_r= 2.258(
density
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1
10
100
1000
10000
100000
1000000
ln real total sales


FIRM SIZE DISTRIBUTION OF MFC FIRMS
(a) Age < 5 year
(b) Age > 30 yea
YOUNG
OLD
AEP DISTRIBUTION PARAME
Young Firms
b_l= 1.253(0.034)
b_r= 1.722
a_l= 1.008(0.022)
a_r= 1.395(
Old Firms
b_l= 1.026(0.039)
b_r= 2.204
a_l= 1.165(0.031)
a_r= 2.131(
density
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1
10
100
1000
10000
100000
1000000
ln real total sales


FIRM SIZE DISTRIBUTION OF HFC FIRMS
YOUNG
OLD
(a) Age < 5 year
(b) Age > 30 yea
AEP DISTRIBUTION PARAME
Young Firms
b_l= 1.283(0.053)
b_r= 1.568
a_l= 1.302(0.042)
a_r= 1.274(
Old Firms
b_l= 0.904(0.065)
b_r= 0.900
a_l= 1.677(0.083)
a_r= 1.389(
density
0.3
0.25
0.2
0.15
0.1
0.05
0
1
10
100
1000
10000
100000
1000000
ln real total sales


MEDIAN FIRM SIZE AND AEP RIGHT WIDTH PARAMETER a_r BY AGE CLASS
NFC
MFC
HFC
median
9
8.5
8
7.5
7
6.5
right width parameter a_r
2.2
2
1.8
1.6
1.4
1.2
1
0.8
<5
5-10
11-20
21-30
>30
Age

Asymmetric Power Exponential distribution

$$f_{AEP}(x;\mathbf{p}) = \frac{1}{C}\ e^{-\left(\frac{1}{b_l}\left|\frac{x-m}{a_l}\right|^{b_l}\theta(m-x)+\frac{1}{b_r}\left|\frac{x-m}{a_r}\right|^{b_r}\theta(x-m)\right)}$$

where $\mathbf{p} = (b_l, b_r, a_l, a_r, m)$, $\theta(x)$ is the Heaviside theta function and C the normalization constant. Back

b_l=2, b_r={5,1,0.5}, a_l=1, a_r=1, m=0

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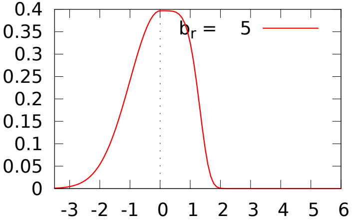

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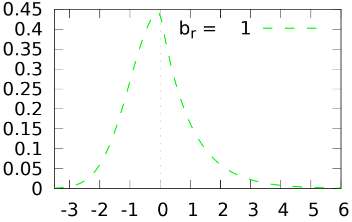

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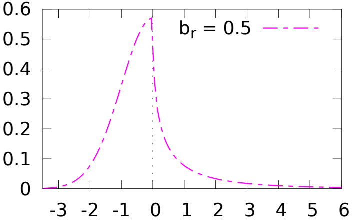

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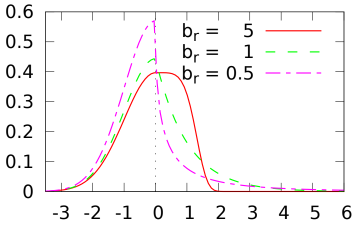

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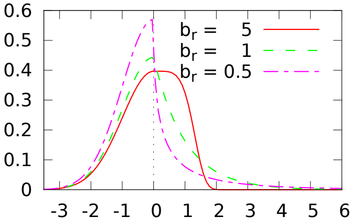
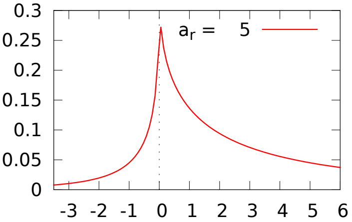
b_l=2, b_r={5,1,0.5}, a_l=1, a_r=1, m=0

b_l=0.5,b_r=0.5,a_l=1,a_r={5,2,0.5}, m=0





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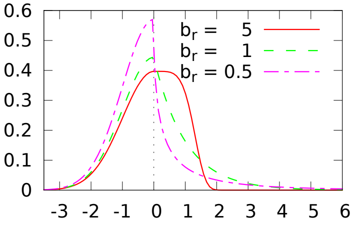

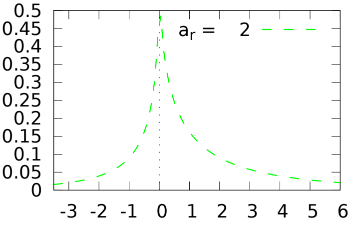

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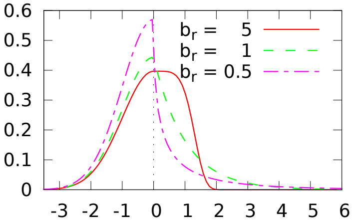

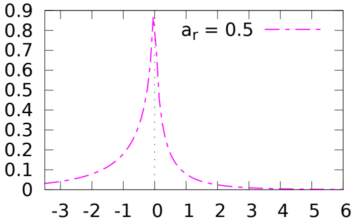

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$$f_{AEP}(x;\mathbf{p}) = \frac{1}{C}\ e^{-\left(\frac{1}{b_l}\left|\frac{x-m}{a_l}\right|^{b_l}\theta(m-x)+\frac{1}{b_r}\left|\frac{x-m}{a_r}\right|^{b_r}\theta(x-m)\right)}$$

where $\mathbf{p} = (b_l, b_r, a_l, a_r, m)$, $\theta(x)$ is the Heaviside theta function and C the normalization constant. Back

b_l=2, b_r={5,1,0.5}, a_l=1, a_r=1, m=0 b_l=0.5,b_r=0.5,a_l=1,a_r={5,2,0.5}, m=0