
Pietro Terna - DipEco

3. Artificial neural networks into the agents

$$y = g(x) = f(B f(A x))$$

(m) (n)

or

actions

information

$$y_1 = g_1(x) = f(B_1 f(A_1 x))$$

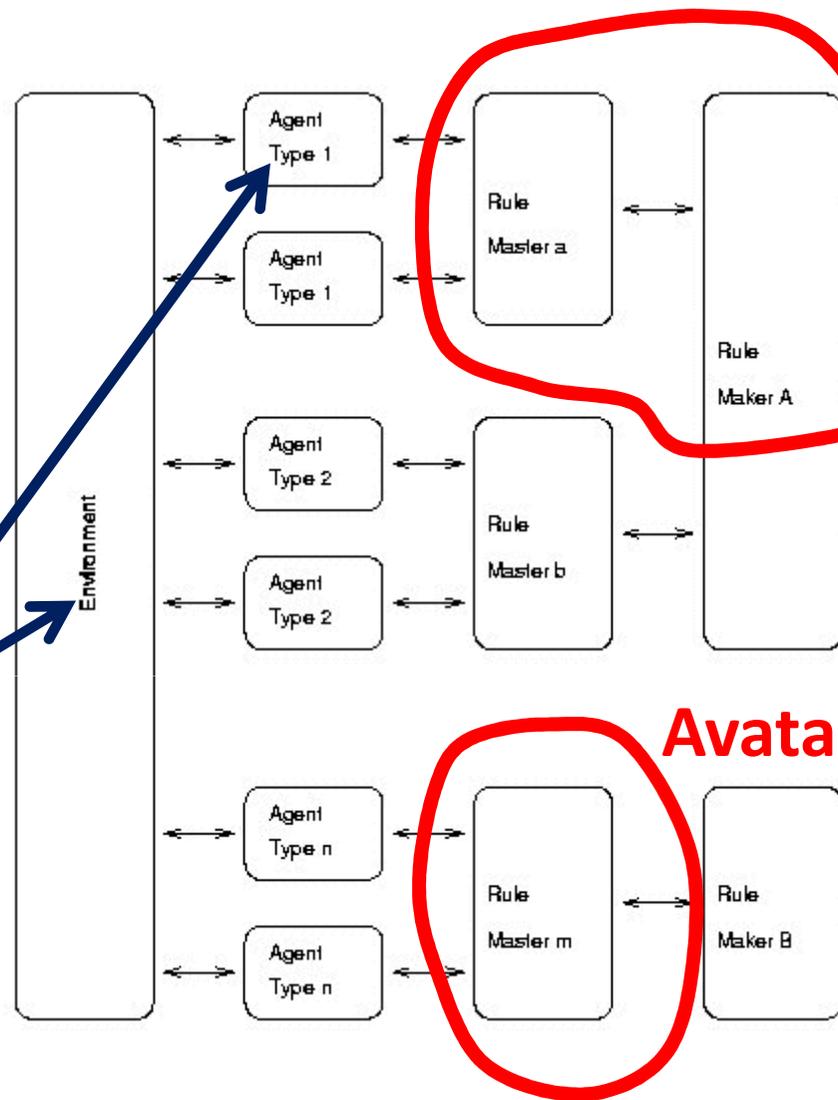
(1) (n)

...

$$y_m = g_m(x) = f(B_m f(A_m x))$$

(1) (n)

**Microstructures,
mainly related to
time and
parallelism**



**Fixed
rules**

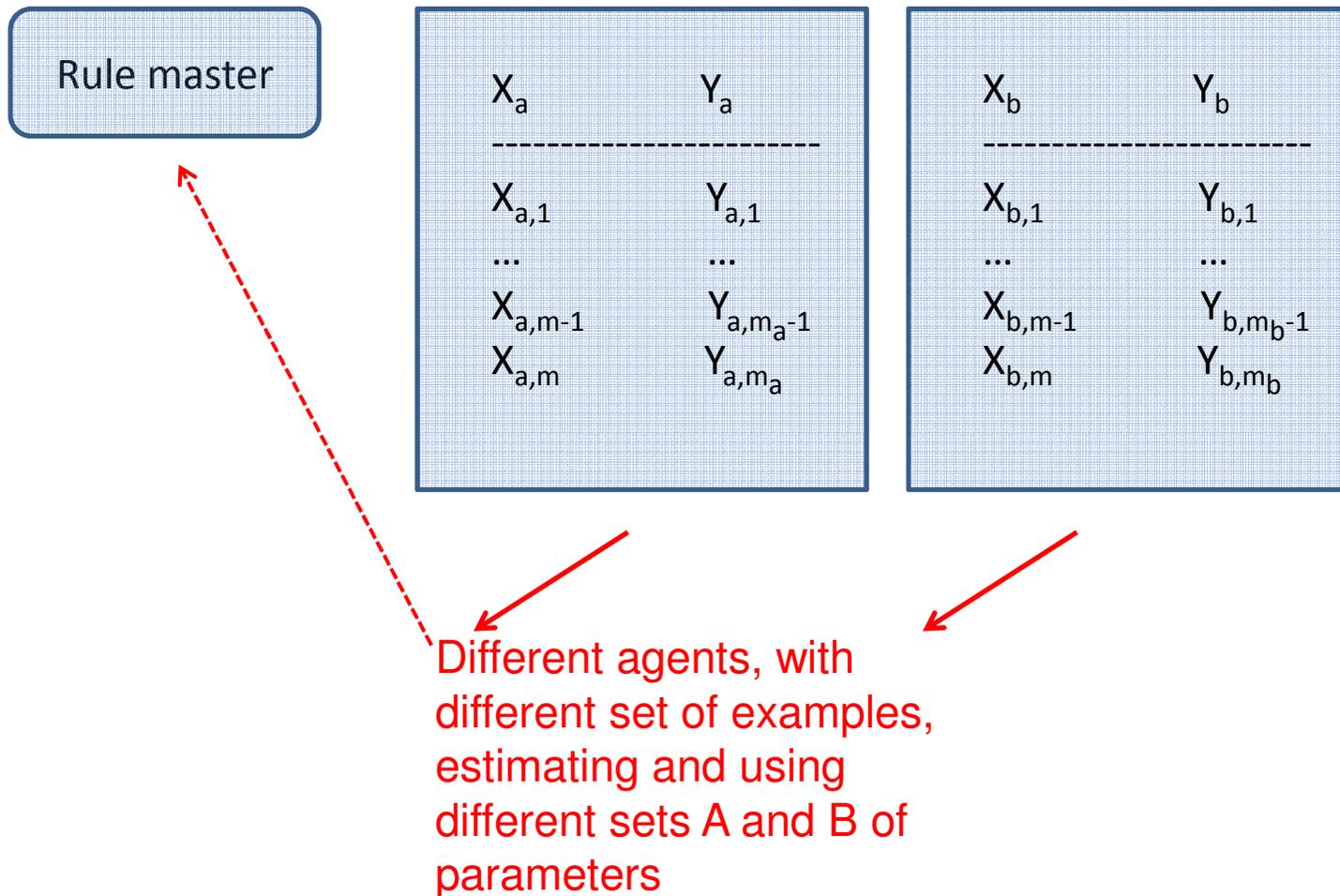
ANN

(CS)

(GA)

**Reinforcement
learning**

a - Static ex-ante learning (on examples)



b - Continuous learning (trials and errors)

$$z = g([x,y]) = f(B f(A [x,y]))$$

(p)

(n+m)

accounting
for laws

actions

information

Rule master

effects

Coming from simulation

accounting
for s. norms

the agents will choose Z
maximizing:

- (i) individual U, with norms
- (ii) societal wellbeing

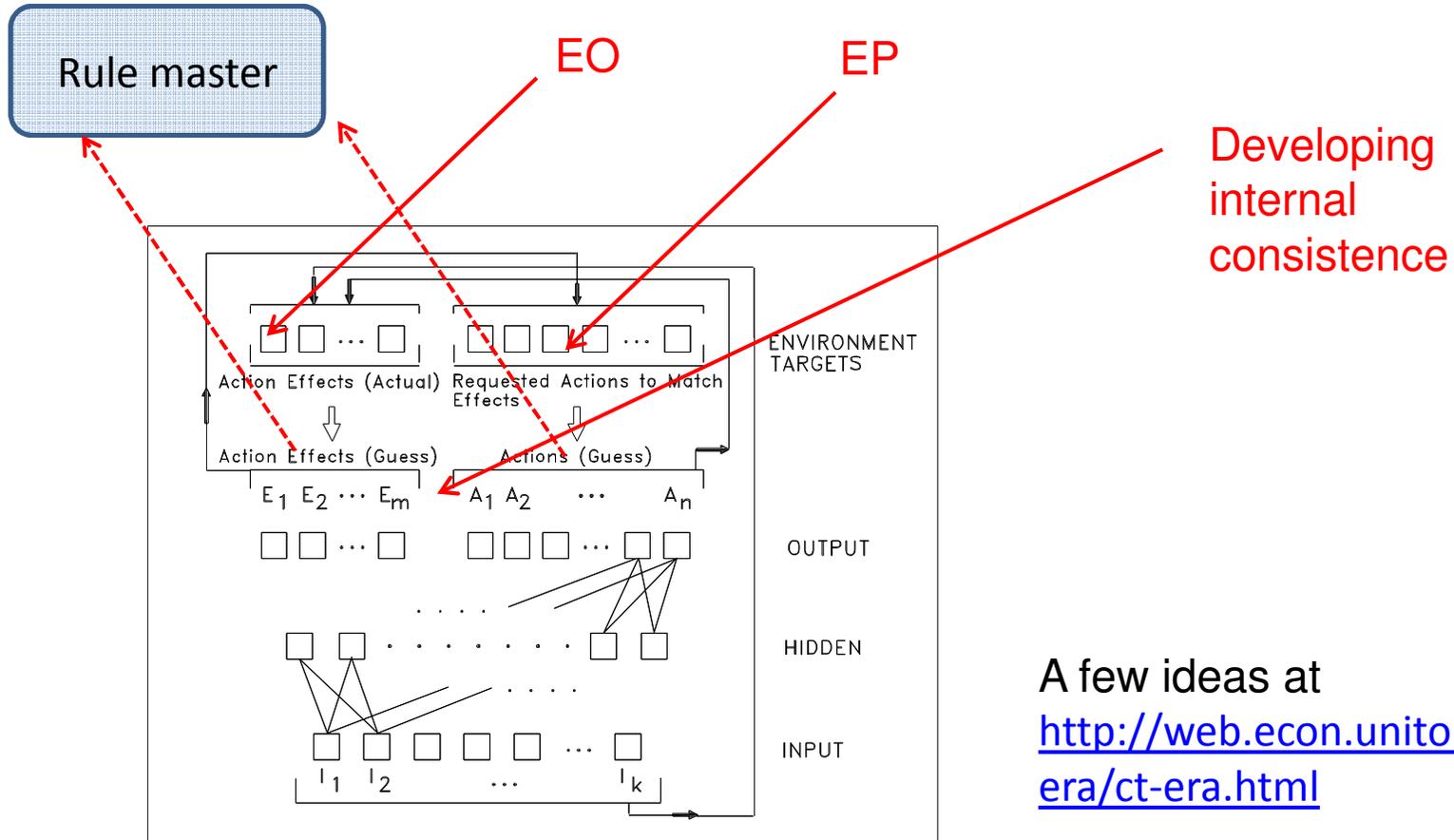
at t=0 or at given
t=k steps,
all or a few agents
act randomly

Different agent, generating
and using different set A and
B of parameters (or using the
same set of parameters)

Emergence of new norms
[modifying $U=f(z)$, as
new norms do] and laws
[modifying the set y, new
laws do]

Also $U=f(z)$ can be a NN

c - Continuous learning (cross-targets)



A few ideas at
<http://web.econ.unito.it/terna/ct-era/ct-era.html>