

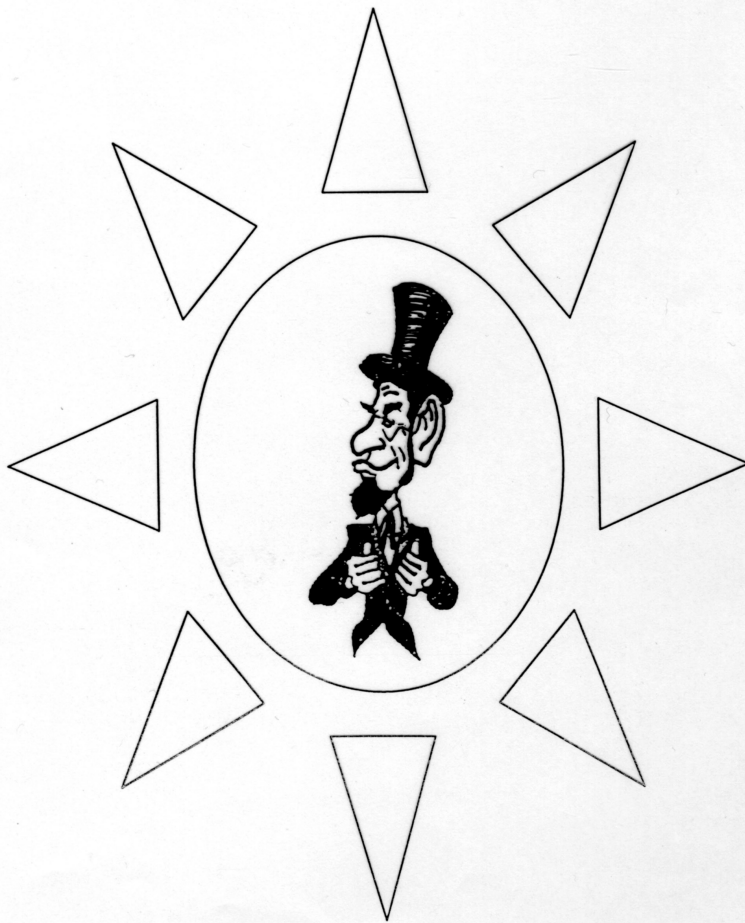
The
Datamaker
Fable

By

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**- Who made the data
that the econometrician faces ?**

- Great Datamaker did !



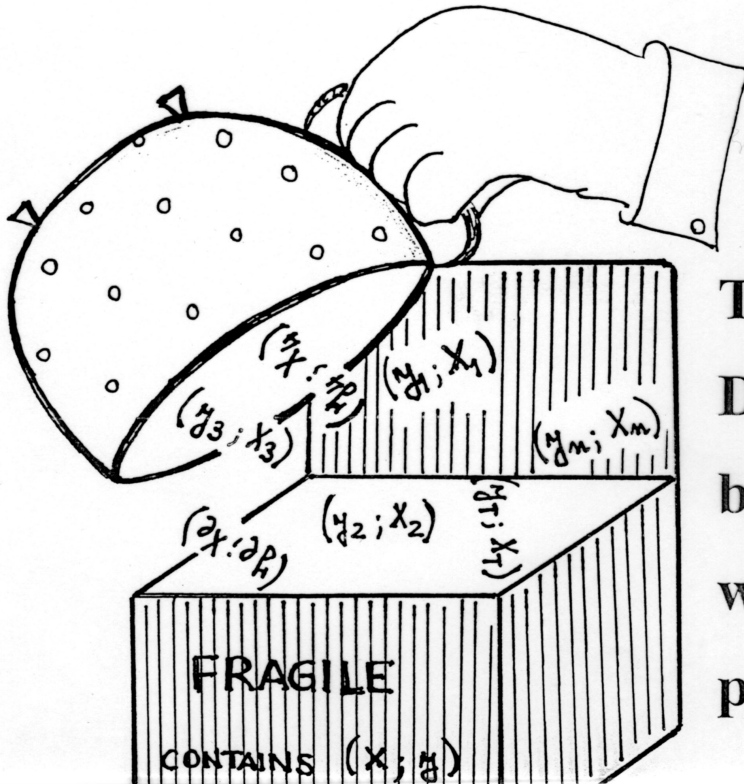
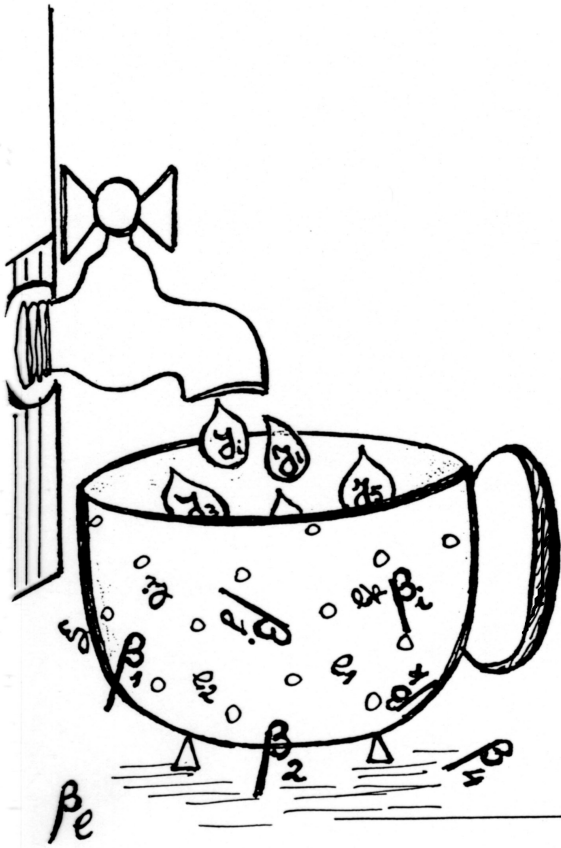
**- How does he produce the data
the econometrician is looking at ?**

- The data production process consists on:

- 1) to take a matrix X**
- 2) to take a vector β**
- 3) to combine them and obtain $X \cdot \beta$**
- 4) to add them vectors of random numbers e**

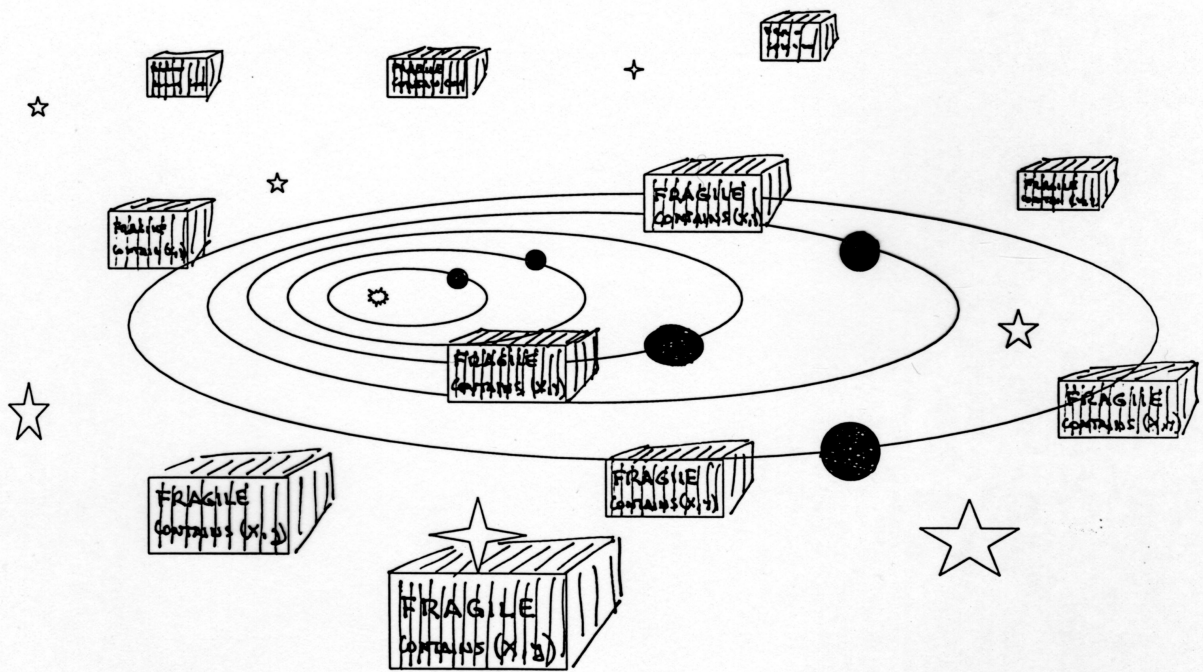
So, finally the output is:

$$Y = X \cdot \beta + e$$



Then,
Datamaker
bundled each y
with X into a
packet,

... and threw it out into the
universe



One of these packets struck the Earth,



**burst open, and create the Economy
which the econometricians study.**

What's about β ?

**The econometrician's problem is
to find out what β is.**

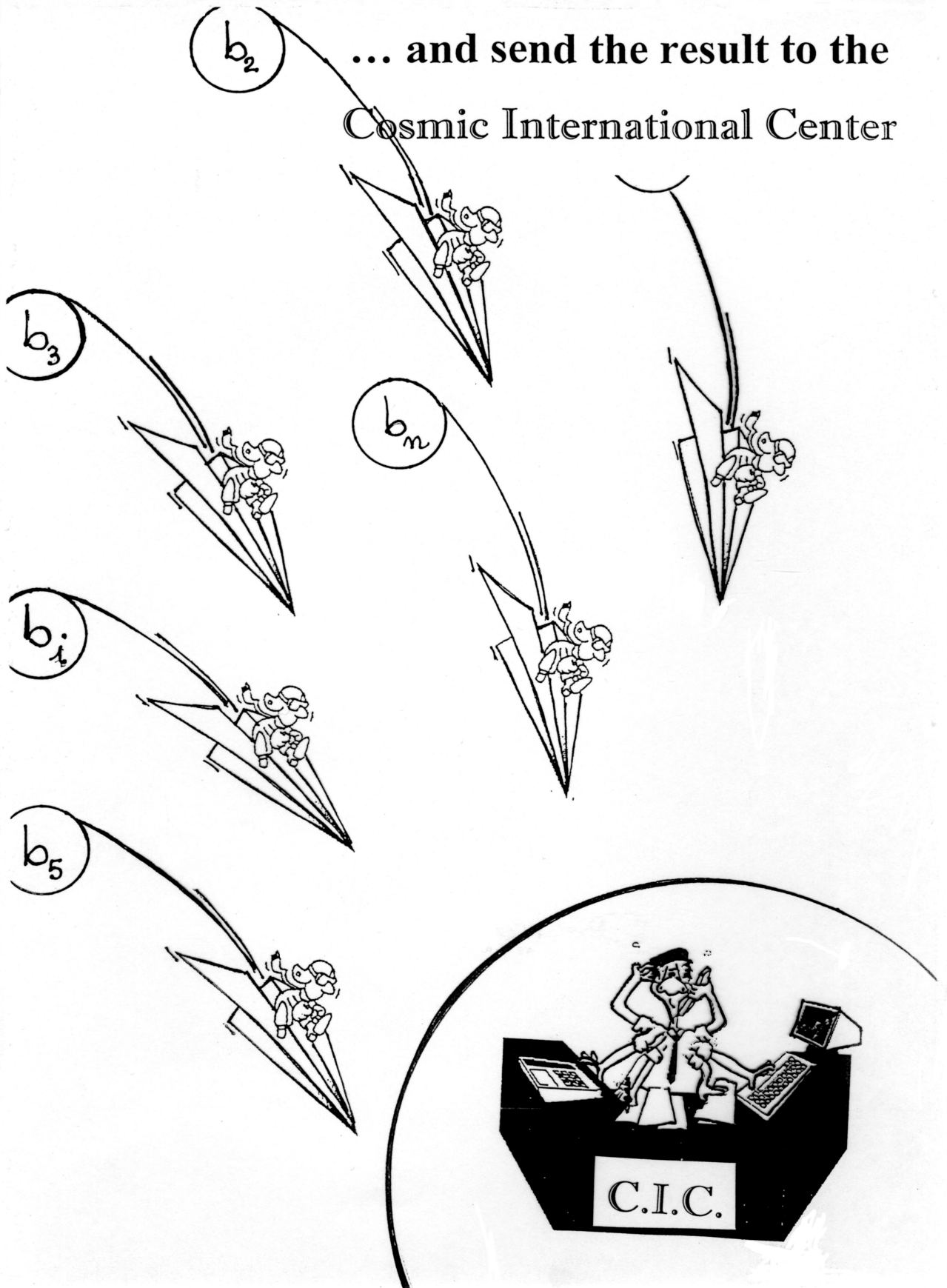
**In the Earth, there's absolutely no chance
to ever catch a second of these packets.**

**The infinitely many others are all caught
elsewhere in the universe.**

**BUT, everyone who catches one packet
must compute**

$$\mathbf{b} = (\mathbf{X}'\mathbf{X})^{-1} \mathbf{X}'\mathbf{y}$$

... and send the result to the
Cosmic International Center



There, the folks will compute the
average of all the b ,
and that average will be β .

Unfortunately, confidentiality requirements
preclude them from
any communication back to the
econometricians.

**So they will never know β ,
only their one and only b .**

(Nevertheless, the econometricians think
that it is gratifying to be part of the effort
which will reveal to the C.I.C. the *true* β).

The way to express their pleasure is to say
that their b is *unbiased*.

This is the end of the fable ?

NO ! Datamaker sometimes tricks !

... and one of the particular tasks of
is to detect such jokes.



$H_0) \beta_i = 0$

$\text{Var}(b) = S^2 \cdot (X'X)^{-1}$

$e \text{ i.i.d. } \sim n(0, \sigma^2)$

All can be said about e , but it is danger
fo r an econometrician reputation as
scientists to imagine he knows something
about β , because it may imply some
economic understanding.