

Loss Simulation Model Working Party

Testing the Model

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2009 CLRS Meeting

Chicago, Illinois

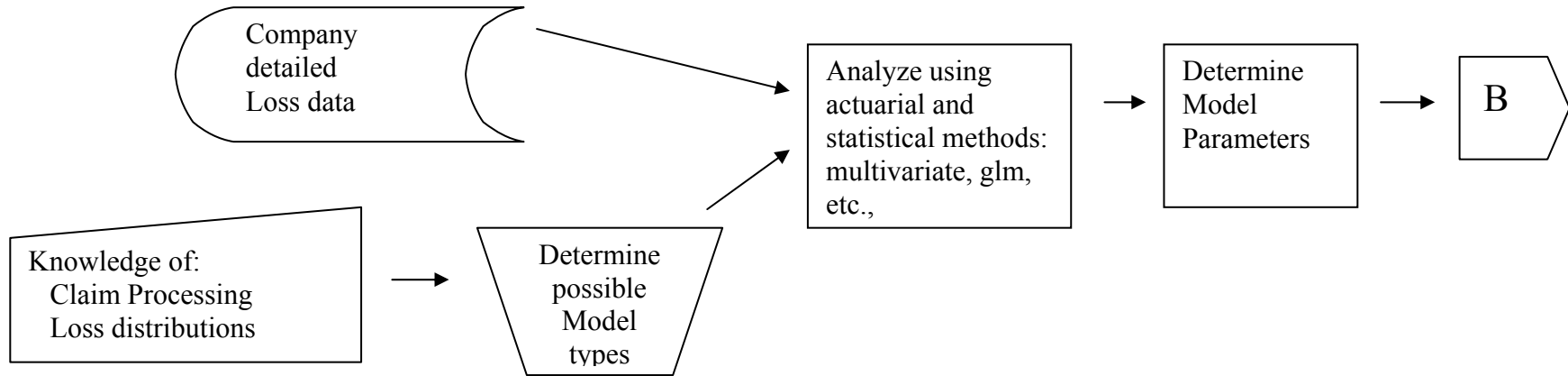
Two main topics for 2009:

Test the simulation model

Discuss how to use Simulator's detailed output

In 2008, discussed Parameterizing the model.

Parameterize the simulator:



“Analyze” step carried out 2007 on one company’s data.
Ball State student project.

Presented at 2008 meetings.

Paper on LSMWP website.

Modeling during 2007 Parameterizing process:

Develop parametric distribution for severity.

Survival models handle censoring / truncation.

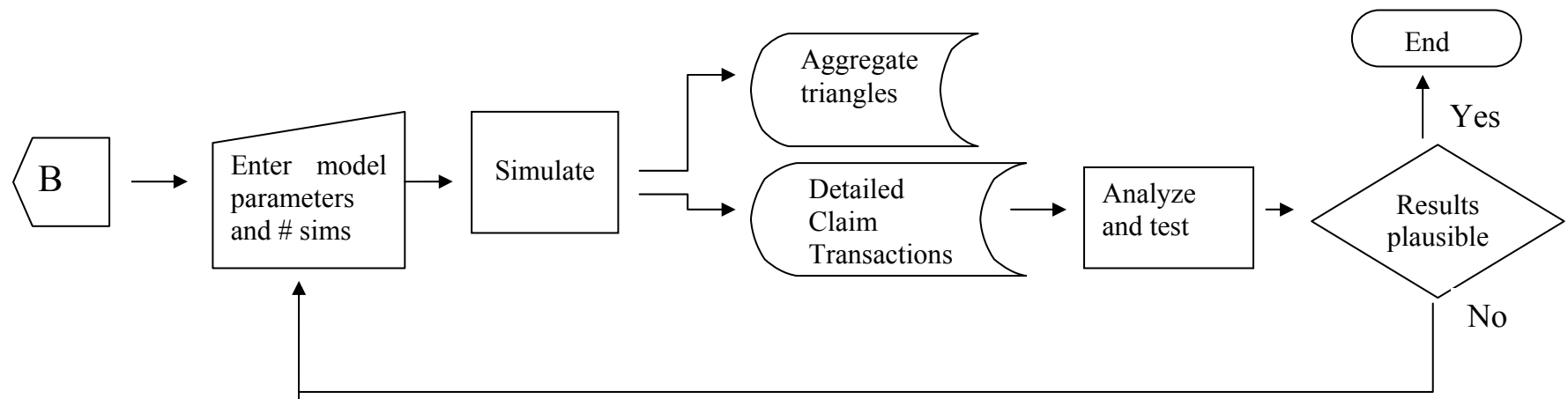
Determine report lag and settlement lag.

Determine joint distribution of settlement lag and size of loss.

Allow state as covariate.

Allow accident year as categorical or numeric variable.

From Simulation to conclusions:



“Analyze and Test” example :

Look at Loss Layer above \$100k – number and size

From  examine empirical distribution of large loss.

Can analyze by accident year, lags, type, payment year, etc.

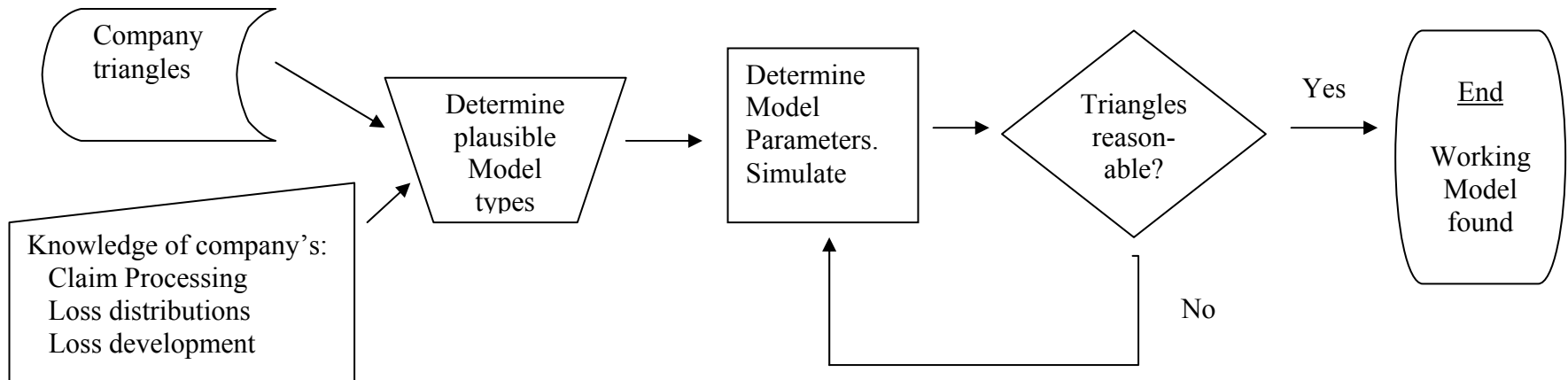
File is in “csv” format – can use many tools:

R, Excel, Database tools, etc.

Another application: Reserve Triangles

Goal: Simulate many triangles to understand distribution.

Parameterize the simulator:



Experimental in nature – does not use detailed files.

Can also test detailed output for plausible loss distributions.

Testing the model:

First tests are very simple, since debugging done at same time.

Typically know the theoretical distribution before model run.

Frequency testing:

Poisson and Negative Binomial # of accidents.

Severity Testing.

Simpler since ultimate loss amount determined before transactions.

Test of Case Reserve changes: More Complex

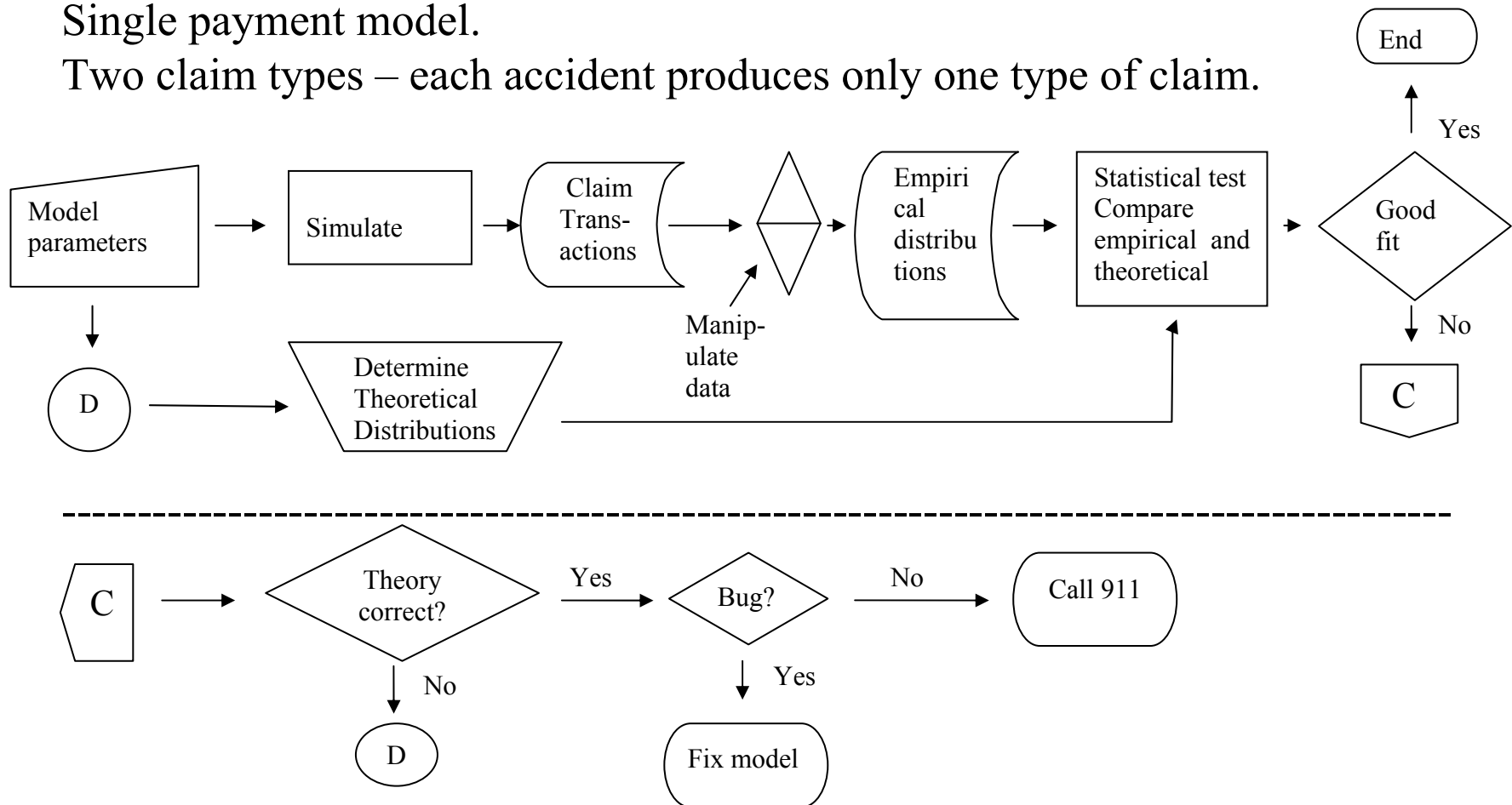
A simple frequency test:

Claims per accident year – Poisson, no trend in the mean.

Set severity $\equiv 1$

Single payment model.

Two claim types – each accident produces only one type of claim.



A simple frequency test (continued):

Testable hypotheses:

- Claims by accident year are i.i.d. Poisson.
- Claims by type are independent Poisson.
- Trend = 0

Some methods:

Kolmogorov-Smirnov and Chi-Square tests

GLM (Poisson):

Treat accident year as a categorical predictor (“indicator” variables).

Are the coefficients of these variables the same?

Other ideas?

Severity and Reserve Change History Tests:

To be developed.

Thoughts:

By-product of testing is “source code” that performs statistical analysis on detailed transaction data. Suppose entity ABC can transform its data to this format.

Can ABC use the source code to:

- Analyze data, independently of whether simulation is done?
- Parameterize the simulator for its use?

Once the Simulator is fit to ABC’s claims information, use Simulator to model real world changes that can be translated to parameter changes.