The Second Run of the Double-Trimming Rule

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Abstract

This paper applies the same two-stage trimming rule developed in *Eliminating the BEST Countries* to the already trimmed cross-section. We show that the procedure reaches a fixed point: no additional sovereigns are eliminated in the second run. The result highlights an empirical idempotence of the operator on the present dataset, despite its theoretical non-idempotence.

The paper ends with "The End"

1 Input sample

The input dataset for the second run consists of the 25 sovereigns retained after the first application of the rule. The first-round elimination set was

$$\mathcal{E}^{(1)} = \{\text{Brazil}, \text{Egypt}, \text{South Africa}, \text{Turkey}\}. \tag{1}$$

All statistics reported below are recomputed exclusively on the remaining 25 observations.

2 Second run: Stage I PD filter

Let p_i denote the five-year cumulative probability of default in the retained sample. Denote the corresponding mean and standard deviation by $\bar{p}^{(1)}$ and $s_p^{(1)}$. The second-run PD acceptance region is

$$CI_p^{(2)} = \bar{p}^{(1)} \pm 1.96 s_p^{(1)}. \tag{2}$$

In the second-run sample, the largest remaining probability of default is 1.50%. The upper bound of $CI_p^{(2)}$ lies strictly above this value. Therefore,

$$\mathcal{E}_p^{(2)} = \varnothing. \tag{3}$$

No country is eliminated by the PD filter in the second run.

3 Second run: Stage II CDS filter

Let s_i denote the five-year CDS spreads in the retained sample. Let $\bar{s}^{(1)}$ and $s_s^{(1)}$ be the mean and standard deviation computed on the second-run PD-filtered sample. The conditional CDS acceptance region is

$$CI_{s|p}^{(2)} = \bar{s}^{(1)} \pm 1.96 s_s^{(1)}. \tag{4}$$

After the first trimming, the dominant right-tail CDS observations have already been removed. Recomputing the conditional CDS interval yields an upper bound that exceeds the largest remaining spread (89.86 bps). Hence

$$\mathcal{E}_s^{(2)} = \varnothing. \tag{5}$$

4 Second-round elimination set

Combining both stages, the elimination set produced by the second application of the rule is

$$\mathcal{E}^{(2)} = \varnothing. \tag{6}$$

The retained sample is unchanged relative to the output of the first run.

5 Fixed-point interpretation

Let Π denote the two-stage trimming operator defined in the companion paper. On the present dataset, the operator empirically satisfies

$$\Pi(\Pi(\mathcal{D})) = \Pi(\mathcal{D}), \tag{7}$$

although Π is not idempotent in general because the second-stage threshold is data dependent.

This fixed-point property indicates that the first trimming pass already removes all observations that dominate the right tails of both the PD and CDS dimensions.
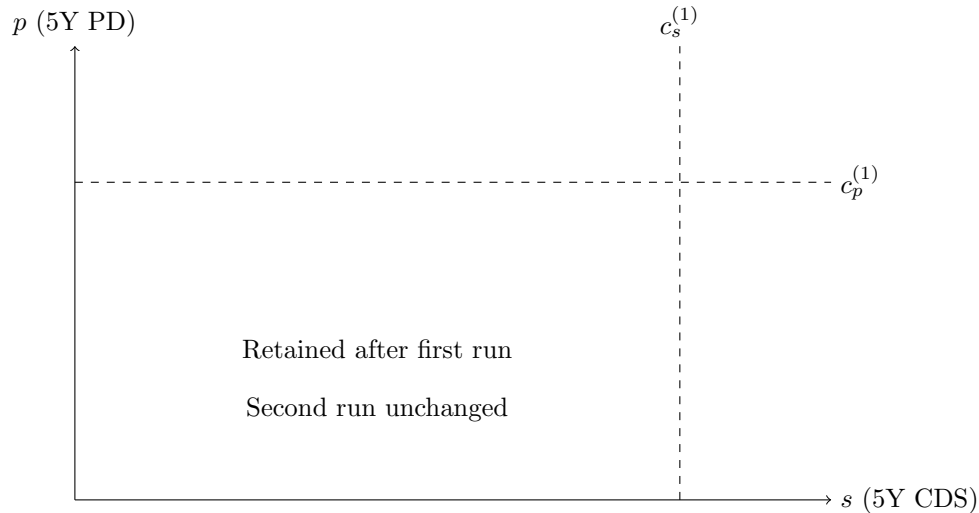
6 Geometric illustration

Figure 1: Schematic representation of the second run. The acceptance region coincides with that obtained after the first run, so no additional observations are removed.

References

[1] D. Duffie and K. Singleton. *Credit Risk: Pricing, Measurement, and Management.* Princeton University Press, 2003.

[2] P. J. Huber and E. M. Ronchetti. *Robust Statistics.* Wiley, 2009.

[3] P. Embrechts, C. Kl"uppelberg, and T. Mikosch. *Modelling Extremal Events for Insurance and Finance.* Springer, 1997.

Glossary

Double-trimming rule A sequential filtering procedure applying a PD confidence interval first and a conditional CDS confidence interval second.

Second run Reapplication of the same double-trimming rule to the already trimmed dataset.

Fixed point A dataset $\mathcal{D}$ such that $\Pi(\mathcal{D}) = \mathcal{D}$.

PD filter The first-stage confidence-interval filter applied to five-year probabilities of default.

Conditional CDS filter The second-stage confidence-interval filter applied to five-year CDS spreads conditional on the PD filter.

The End