# Solvabilté II : Calibration des chocs de capital de solvabilité requis avec expected shortfall.

Kevin BAMOUNI

01/09/2020

Conservatoire National des Arts et Métiers (CNAM Paris) / EFAB
Master 2 Actuariat
STA217 Gestion quantitative du risque en finance et assurance

Projet de fin d'année basé sur l'article "Solvency II solvency capital requirement for life insurance companies based on expected shortfall" de Tim J. Boonen publié en Octobre 2017.

## 1 INTRODUCTION

Academic workflow, certainly in political science, is at a crossroads. The *American Journal of Political Science* (*AJPS*) announced a (my words) "show your work" initiative in which authors who are tentatively accepted for publication at the journal must hand over the raw code and data that produced the results shown in the manuscript. The editorial team at *AJPS* then reproduces the code from the manuscript. Pending successful replication, the manuscript moves toward publication. The *AJPS* might be at the fore of this movement, and it could be the most aggressive among political science journals, but other journals in our field have signed the joint Data Access & Research Transparency (DART) initiative. This, at a bare minimum, requires uploading code from quantitatively-oriented published articles to in-house directories hosted by the journal or to services like Dataverse.

# 2 SOLVABILITE 2

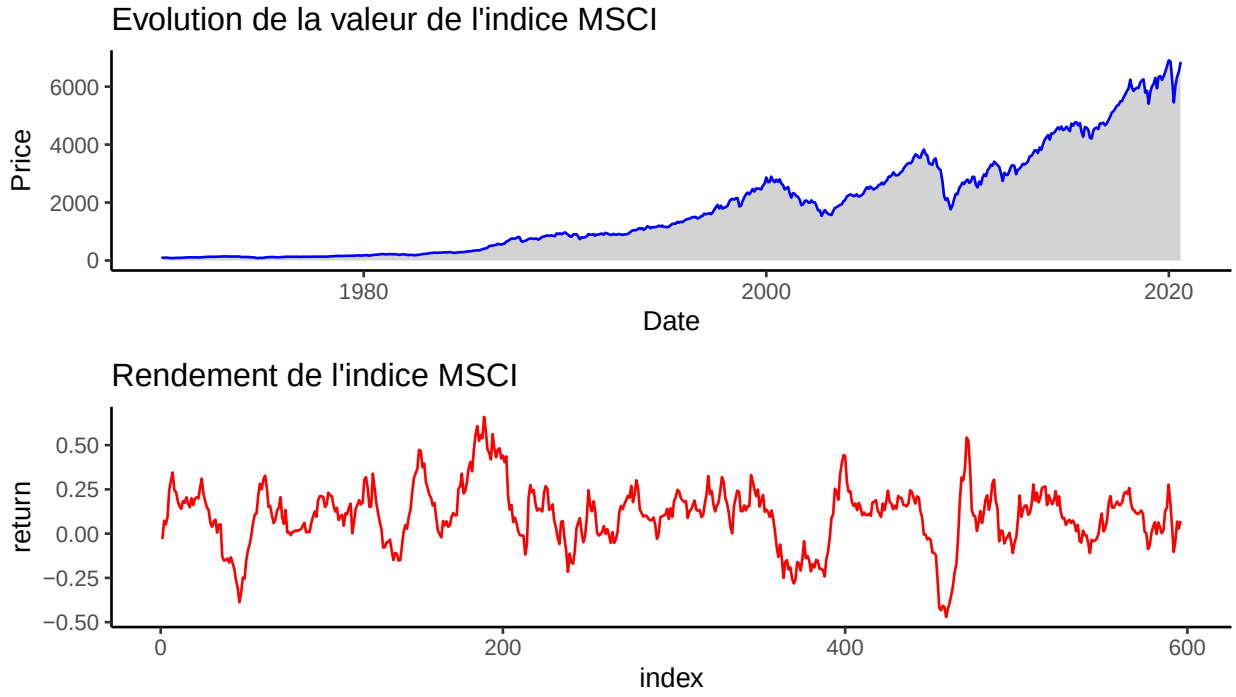
# 3 MODELE DE L'ARTICLE : ESPECTED SHORTFALL POUR LA CALIBRATION DES CHOCS DE CALCUL DU SCR (CSR)

## 3.1 DESCRIPTION

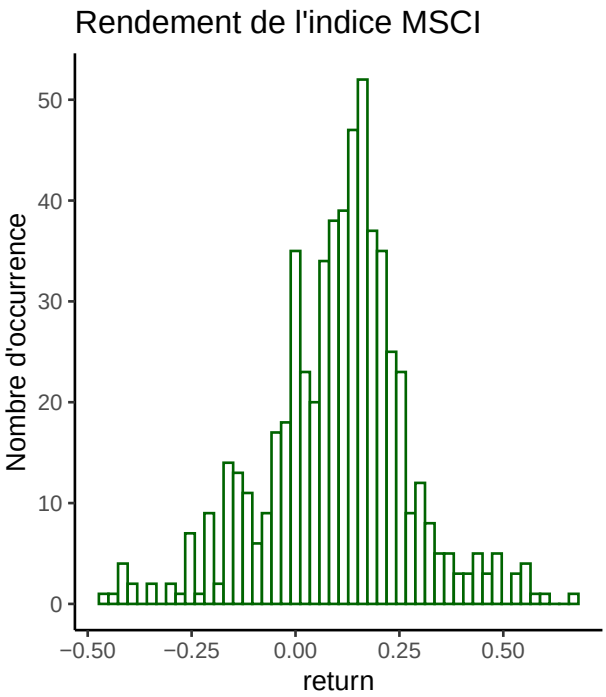
## 3.2 MODELE DE CALIBRATION DES CHOCS DE CAPITAL DE SOLVABILITE REQUIS

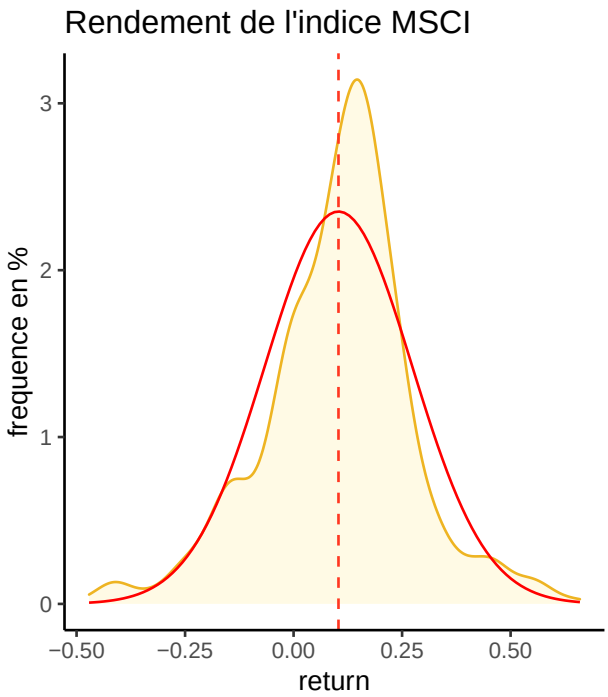
### 3.2.1 CALIBRATION DU CHOC SUR LES ACTIONS

Calibration du choc scr sur les actions




Distribution des rendements




Value at risque historique sur les données de rendements annualisées

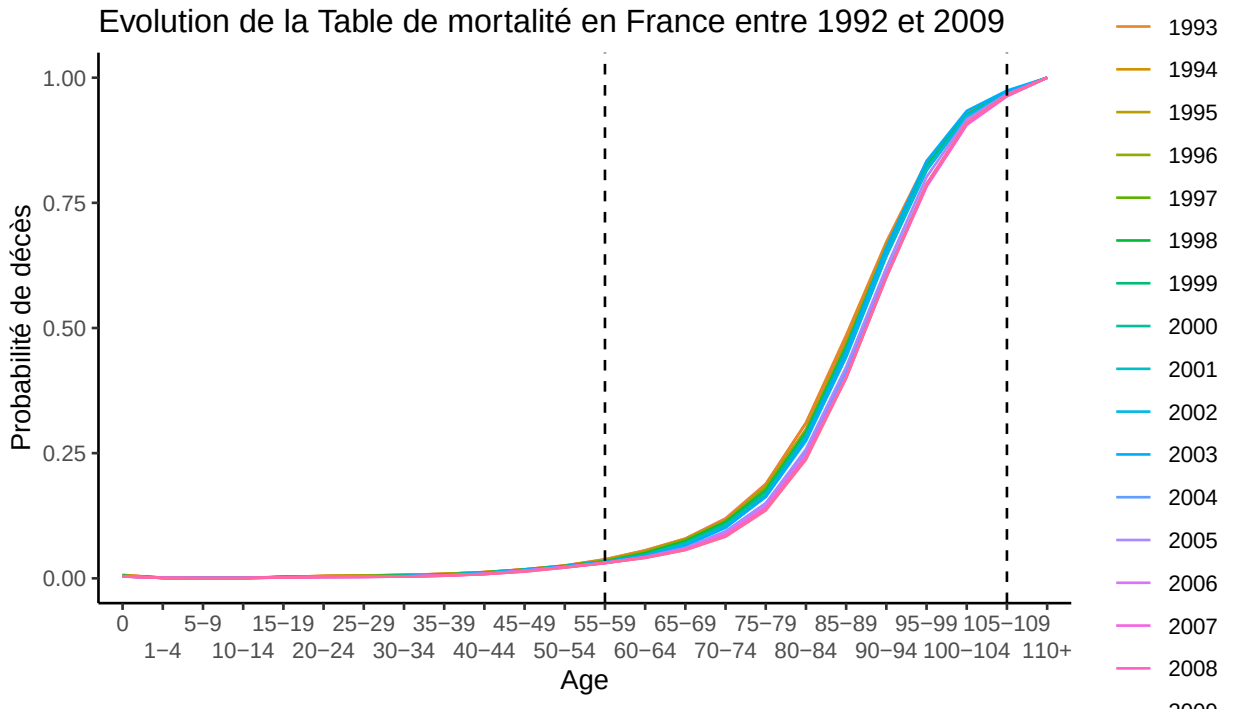
Value at risque d'une loi normale théorique

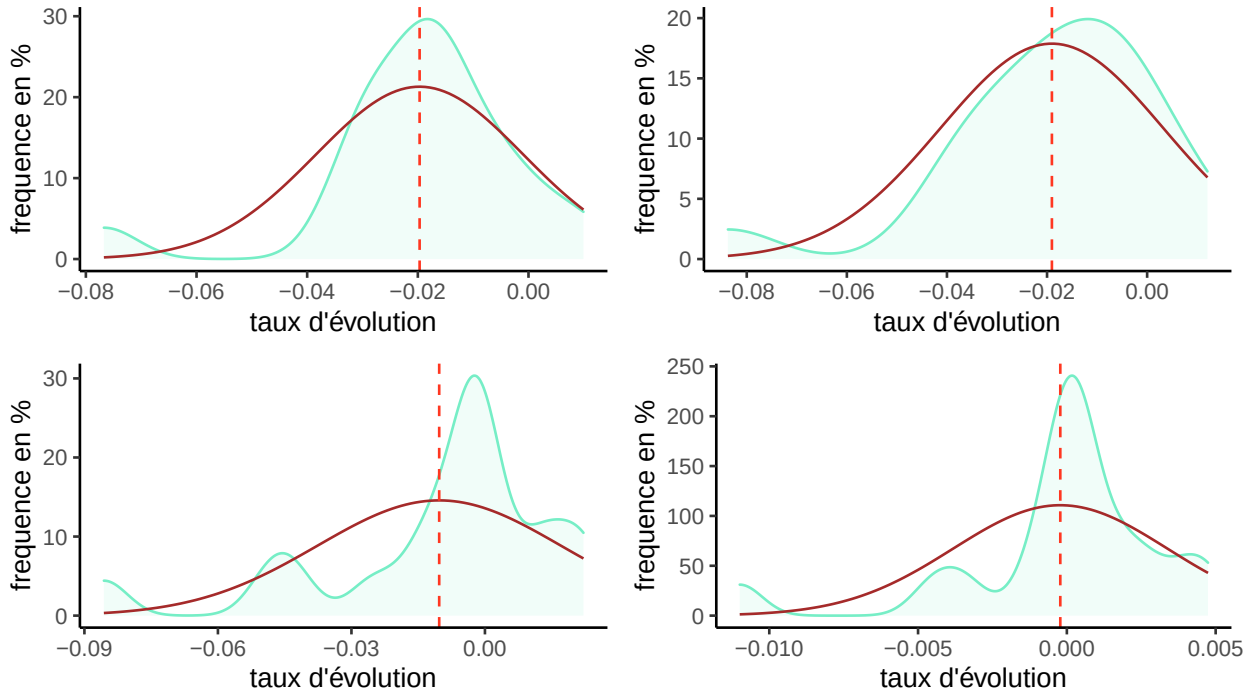
TAB. 1 : Choc calibré pour le SCR marché.

| $\alpha(\%)$ | $\theta(\alpha)(\%)$ | $VaR_{\alpha}(\%)$ | $ES_{\theta(\alpha)}(\%)$ |
|---|---|---|---|
| 99.5 | 98.85 | -50.08 | -50.33 |

### 3.2.2 CALIBRATION DU CHOC SUR LES TAUX

### 3.2.3 CALIBRATION DU CHOC SUR LA LONGEVITE




Calcul des ES En moyenne pour toutes les tranches d'age et tous les pays.

TAB. 2 : Choc calibré pour le SCR Longévité.

| $\alpha(\%)$ | $\theta(\alpha)(\%)$ | $VaR_\alpha(\%)$ | $ES_{\theta(\alpha)}(\%)$ |
|---|---|---|---|
| 99.5 | 98.71 | -18.31 | -18.32 |

# 4 THEORIE DES VALEURS EXTREMES POUR LA CALIBRATION DES CHOCS

# 5 CONCLUSION

# 6 REFERENCES

# 7 ANNEXES avec codes, figures en plus etc.).

## 7.1 packages R

## 7.2 articles