

# Efficiency of CIs under Renormalization

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```
library("NPRHonest")
```

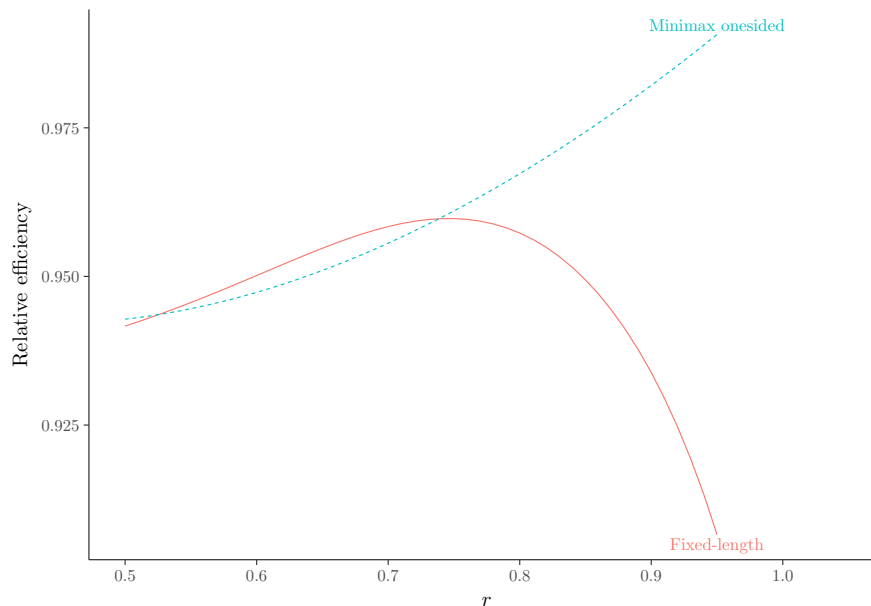
## 1 Efficiency bounds

Compute asymptotic efficiency bounds for fixed-length two-sided and minimax one-sided CIs:

```
AEffBoundCI(r = 4/5, alpha = 0.1, what = "FLCI")  
#> [1] 0.932043  
AEffBoundCI(r = 4/5, what = "OCI")  
#> [1] 0.967278
```

Plot:

```
library("ggplot2") # otherwise directlabels craps out  
p1 <- plot_AEffBoundCI()  
p1
```



## 2 Efficiency of MSE bandwidth

The function `BWEfficiency` computes the optimal  $t^*$  for the three performance criteria, MSE, quantiles of excess length of onesided CIs, and fixed-length CIs. It also computes efficiency of CIs centered around the MSE optimal bandwidth.

```
d <- BWEfficiency(r = c(1/2, 2/3, 4/5, 6/7, 1), beta = c(0.5, 0.8), alpha = c(0.1,  
  0.05, 0.01))
```

```
t3 <- reshape2::dcast(d, criterion + alpha + beta ~ round(r, 3), value.var = "MSEEfficiency")
pander::pandoc.table(t3, justify = "left")
```

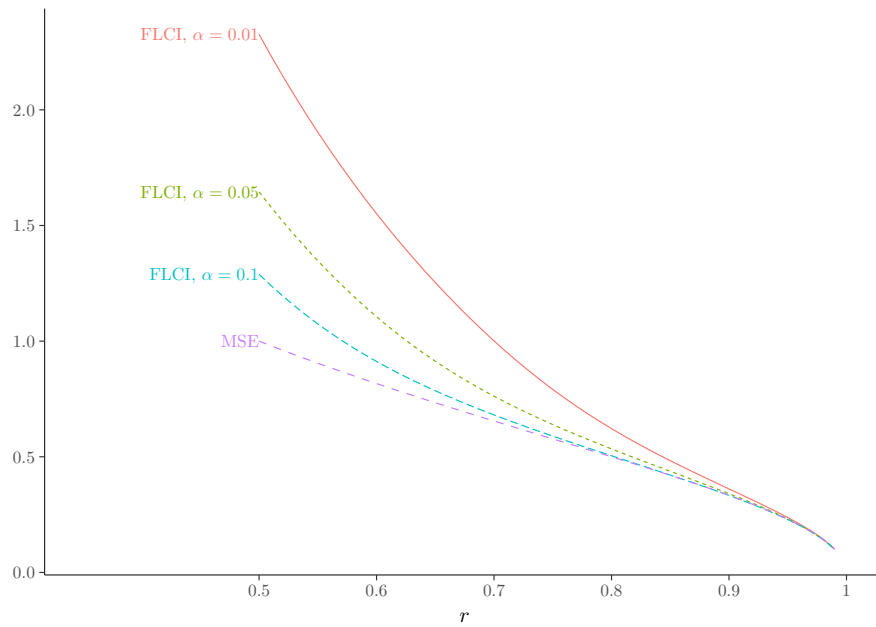
criterion	alpha	beta	0.5	0.667	0.8	0.857	1
MSE	NA	NA	1	1	1	1	1
FLCI	0.01	NA	0.917	0.9734	0.9952	0.9985	1
FLCI	0.05	NA	0.9693	0.9948	0.9994	0.9998	1
FLCI	0.1	NA	0.9912	0.9994	1	1	1
OCI	0.01	0.5	0.9972	0.9957	0.9743	0.9605	1
OCI	0.01	0.8	0.9741	0.9986	0.9955	0.9872	1
OCI	0.05	0.5	0.9952	0.9663	0.9286	0.9112	1
OCI	0.05	0.8	0.9941	0.9981	0.9804	0.9676	1
OCI	0.1	0.5	0.9757	0.9284	0.8816	0.8631	1
OCI	0.1	0.8	0.9996	0.9906	0.9645	0.9495	1

## 2.1 Figures

The function `EfficiencyFigures` draws plots of MSE efficiency and optimal bias-variance ratios.

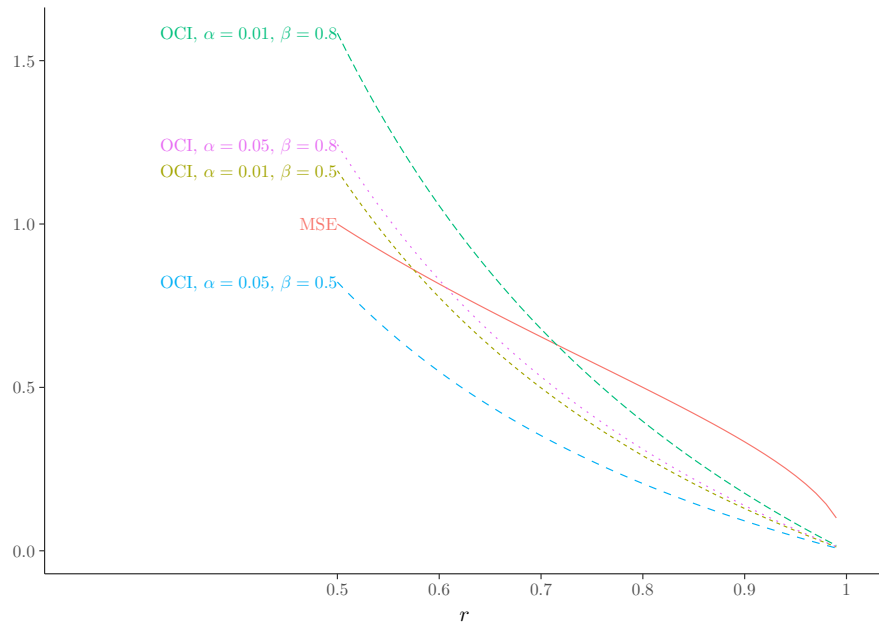
Optimal  $t^*$  for FLCI and MSE:

```
library("ggplot2") # otherwise directlabels craps out
r <- plot_BWEfficiency()
r$p1
```



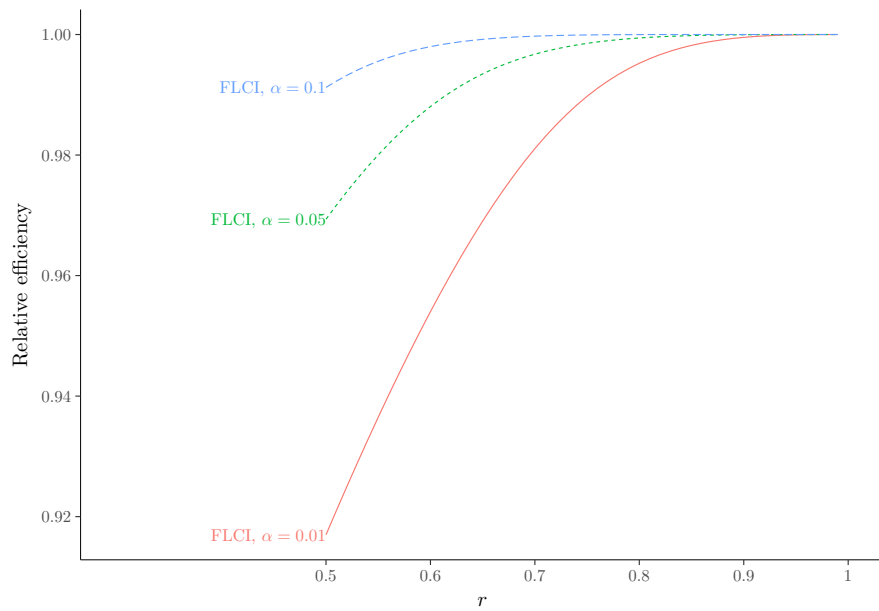
Optimal  $t^*$  for OCI and MSE:

r\$p2



Efficiency of FLCIs around minimax MSE bw:

r\$p3



Efficiency of OCIs around minimax MSE bw:

r\$p4

