

# Package ‘modelimpact’

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**Type** Package

**Title** Functions to Assess the Business Impact of Churn Prediction Models

**Version** 1.0.0

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**Description** Calculate the financial impact of using a churn model in terms of cost, revenue, profit and return on investment.

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**URL** <https://github.com/PeerChristensen/modelimpact>

**BugReports** <https://github.com/PeerChristensen/modelimpact/issues>

**Encoding** UTF-8

**LazyData** true

**RoxygenNote** 7.1.1

**Imports** dplyr, magrittr, utils

**Depends** R (>= 2.10)

**NeedsCompilation** no

**Repository** CRAN

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cost_revenue	<i>Calculate cost and revenue</i>
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**Description**

Calculates cost and revenue after sorting observations.

**Usage**

```
cost_revenue(
  x,
  fixed_cost = 0,
  var_cost = 0,
  tp_val = 0,
  prob_col = NA,
  truth_col = NA
)
```

**Arguments**

x	A data frame containing predicted probabilities of a target event and the actual outcome/class.
fixed_cost	Fixed cost (e.g. of a campaign)
var_cost	Variable cost (e.g. discount offered)
tp_val	The average value of a True Positive
prob_col	The unquoted name of the column with probabilities of the event of interest.
truth_col	The unquoted name of the column with the actual outcome/class. Possible values are 'Yes' and 'No'.

**Value**

A data frame with the following columns:

```
row = row numbers
pct = percentiles
cost_sum = cumulated costs
cum_rev = cumulated revenue
```

**Examples**

```
cost_revenue(predictions,
  fixed_cost = 1000,
  var_cost   = 100,
  tp_val     = 2000,
  prob_col   = Yes,
  truth_col  = Churn)
```

---

predictions

*Predictions from a customer churn model.*

---

### Description

A dataset containing 2145 observations with four columns specifying predicted probabilities and predicted and actual class.

### Usage

```
predictions
```

### Format

A data frame with 2145 rows and 4 variables:

**predict** Predicted class

**No** Predicted probability of class 'No'

**Yes** Predicted probability of class 'Yes'

**Churn** Actual class ...

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profit

*Calculate profit*

---

### Description

Calculates profit after sorting observations.

### Usage

```
profit(  
  x,  
  fixed_cost = 0,  
  var_cost = 0,  
  tp_val = 0,  
  prob_col = NA,  
  truth_col = NA  
)
```

**Arguments**

x	A data frame containing predicted probabilities of a target event and the actual outcome/class.
fixed_cost	Fixed cost (e.g. of a campaign)
var_cost	Variable cost (e.g. discount offered)
tp_val	The average value of a True Positive
prob_col	The unquoted name of the column with probabilities of the event of interest.
truth_col	The unquoted name of the column with the actual outcome/class. Possible values are 'Yes' and 'No'.

**Value**

A data frame with the following columns:

row = row numbers

pct = percentiles

profit = profit for number of rows selected

**Examples**

```
profit(predictions,
  fixed_cost = 1000,
  var_cost   = 100,
  tp_val     = 2000,
  prob_col   = Yes,
  truth_col  = Churn)
```

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profit\_thresholds      *Find optimal threshold for churn prediction (class)*

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**Description**

Finds the optimal threshold (from a business perspective) for classifying churners.

**Usage**

```
profit_thresholds(
  x,
  var_cost = 0,
  prob_accept = 1,
  tp_val = 0,
  fp_val = 0,
  tn_val = 0,
  fn_val = 0,
  prob_col = NA,
  truth_col = NA
)
```

**Arguments**

x	A data frame containing predicted probabilities of a target event and the actual outcome/class.
var_cost	Variable cost (e.g. of a campaign offer)
prob_accept	Probability of offer being accepted. Defaults to 1.
tp_val	The average value of a True Positive. 'var_cost' is automatically subtracted.
fp_val	The average cost of a False Positive. 'var_cost' is automatically subtracted.
tn_val	The average value of a True Negative.
fn_val	The average cost of a False Negative.
prob_col	The unquoted name of the column with probabilities of the event of interest.
truth_col	The unquoted name of the column with the actual outcome/class. Possible values are 'Yes' and 'No'.

#' @return A data frame with the following columns:  
 threshold = prediction thresholds  
 payoff = calculated profit for each threshold

**Examples**

```
profit_thresholds(predictions,
  var_cost = 100,
  prob_accept = .8,
  tp_val = 2000,
  fp_val = 0,
  tn_val = 0,
  fn_val = -2000,
  prob_col = Yes,
  truth_col = Churn)
```

roi

*Calculate Return on investment (ROI)***Description**

Calculates ROI after sorting observations with ROI defined as (Current Value - Start Value) / Start Value

**Usage**

```
roi(x, fixed_cost = 0, var_cost = 0, tp_val = 0, prob_col = NA, truth_col = NA)
```

**Arguments**

<code>x</code>	A data frame containing predicted probabilities of a target event and the actual outcome/class.
<code>fixed_cost</code>	Fixed cost (e.g. of a campaign)
<code>var_cost</code>	Variable cost (e.g. discount offered)
<code>tp_val</code>	The average value of a True Positive
<code>prob_col</code>	The unquoted name of the column with probabilities of the event of interest.
<code>truth_col</code>	The unquoted name of the column with the actual outcome/class. Possible values are 'Yes' and 'No'.

**Value**

A data frame with the following columns:

`row` = row numbers  
`pct` = percentiles  
`cum_rev` = cumulated revenue  
`cost_sum` = cumulated costs  
`roi` = return on investment

**Examples**

```
roi(predictions,  
    fixed_cost = 1000,  
    var_cost   = 100,  
    tp_val     = 2000,  
    prob_col   = Yes,  
    truth_col  = Churn)
```

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