

# Package ‘fee’

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**Type** Package

**Title** Estimate the First-Exposure Effect (FEE) using Count Data Models

**Version** 1.0.0

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**Description** Estimates the first-exposure effect (FEE) using a one-inflated positive Poisson model, or a one-inflated zero-truncated negative binomial model. In addition, estimates the marginal FEE, and standard errors for the FEE and marginal FEE.

**License** GPL (>= 3)

**Imports** graphics, oneinfl

**Encoding** UTF-8

**RoxygenNote** 7.3.2

**NeedsCompilation** no

**Repository** CRAN

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|------|----------------------------------------|
| dfee | <i>Marginal First-Exposure Effects</i> |
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**Description**

Computes marginal first-exposure effects from a fitted `oneinfl` model. Dummy variables are automatically detected as those with exactly two unique values in the data, and corresponding marginal effects are instead calculated by differencing the FEE between both values of the dummy.

**Usage**

```
dfee(model, data, at = "AE")
```

**Arguments**

|                    |                                                                                                                                                                                            |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>model</code> | A fitted model object of class <code>"oneinfl"</code> .                                                                                                                                    |
| <code>data</code>  | A data frame containing the variables used to fit the model.                                                                                                                               |
| <code>at</code>    | A character string or list. Specifies where the marginal FEE should be evaluated. Options are <code>"AE"</code> (average), <code>"EM"</code> (means), or a named list of covariate values. |

**Details**

The marginal effects can be evaluated in three ways, determined by the `at` argument:

- `"AE"`: Average over all data points (default).
- `"EM"`: Evaluate at the sample means of the covariates.
- `list`: Evaluate at a user-specified set of covariate values.

**Value**

A list with components:

`dfee` A named numeric vector of estimated marginal first-exposure effects for each variable.

`sefee` A numeric vector of standard errors corresponding to the marginal effects.

`where` A character string describing the evaluation point.

**See Also**

[fee](#), [dfee\\_pois](#), [dfee\\_nb](#)

**Examples**

```
df <- data.frame(x = runif(10,0,10), d = sample(c(0,1), 10, replace=TRUE), y = rpois(10, 3) + 1)
model <- oneinfl::oneinfl(formula = y ~ x + d | x + d, df = df, dist = "Poisson")
dfee(model, data = df)
```

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|     |                              |
|-----|------------------------------|
| fee | <i>First-Exposure Effect</i> |
|-----|------------------------------|

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**Description**

Computes the first-exposure effect (FEE) from a fitted ‘oneinfl’ model object. The FEE measures the difference between the expected count for a first-time exposure and the expected count under the baseline (non-inflated) model. The function supports models estimated using either a one-inflated positive Poisson distribution or a one-inflated zero-truncated negative binomial distribution.

**Usage**

```
fee(model, data, at = "AE")
```

**Arguments**

|       |                                                                                                                                                                                                                                                       |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| model | A fitted model object of class "oneinfl".                                                                                                                                                                                                             |
| data  | The original data frame used to fit the model.                                                                                                                                                                                                        |
| at    | A character string or list. Specifies how the first-exposure effect should be evaluated. Options are "AE" (average effect across the data), "EM" (effect at means), or a named list specifying covariate values for evaluating a representative case. |

**Details**

The effect can be evaluated in three ways, determined by the ‘at’ argument:

- "AE": Average the FEE over all data points (default).
- "EM": Evaluate the FEE at the sample means of the covariates.
- list: Evaluate the FEE at a user-specified set of covariate values.

If ‘at = "AE"’, the returned object also includes the total number of treatment visits implied by the FEE across all observations.

**Value**

A list with components:

fee The estimated first-exposure effect.

sefee The standard error of the estimated effect.

where A character string describing the evaluation point.

treatment\_visits (Optional) Total implied treatment visits if at = "AE".

**Examples**

```
# Example usage
df <- data.frame(x = runif(10,0,10), d = sample(c(0,1), 10, replace=TRUE), y = rpois(10, 3) + 1)
model <- oneinfl::oneinfl(formula = y ~ x + d | x + d, df = df, dist = "Poisson")
fee(model, data = df)
```

feepLOT

*Plot First-Exposure Effect Distribution***Description**

Creates a bar plot of the observed count data overlaid with fitted values from a `oneinfl` model and its associated counterfactual (non-inflated) model.

**Usage**

```
feepLOT(model, data, maxpred, ylimit, cex = 1.5, lwd = 1.5, ...)
```

**Arguments**

|                      |                                                                                                                               |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <code>model</code>   | A fitted object of class "oneinflmodel".                                                                                      |
| <code>data</code>    | A data frame containing the original data used to fit the model.                                                              |
| <code>maxpred</code> | Optional integer indicating the maximum count value to include on the x-axis. Defaults to the maximum observed value in data. |
| <code>ylimit</code>  | Optional numeric value specifying the upper limit of the y-axis. Defaults to 110% of the maximum observed count frequency.    |
| <code>cex</code>     | A numeric value for point size in the overlay plot. Defaults to 1.5.                                                          |
| <code>lwd</code>     | A numeric value for line width in the overlay plot. Defaults to 1.5.                                                          |
| <code>...</code>     | Additional arguments passed to <code>points()</code> or <code>lines()</code> .                                                |

**Details**

The factual predictions come from the fitted `oneinfl` model, while the counterfactual distribution is obtained by transforming the model into a non-inflated counterpart using the same estimated parameters.

The function detects whether the model is based on a Poisson or negative binomial distribution and selects the appropriate counterfactual model.

**Value**

A barplot with overlaid predicted values from the factual and counterfactual distributions, including a legend identifying each component.

**See Also**

[feepred](#), [fee](#), [dfree](#)

**Examples**

```
df <- data.frame(x = runif(10,0,10), d = sample(c(0,1), 10, replace=TRUE), y = rpois(10, 3) + 1)
model <- oneinfl::oneinfl(formula = y ~ x + d | x + d, df = df, dist = "Poisson")
feepLOT(model, data = df)
```

feepred

*Predicted Counts from One-Inflated or Truncated Count Models***Description**

Computes the predicted count distribution from a fitted model of class "oneinflmodel", "truncmodel", or "basicPoisson". The function returns the expected frequency for each count value from 1 up to maxpred, based on the model's parameters.

**Usage**

```
feepred(model, data, maxpred)
```

**Arguments**

|         |                                                                                                                                                                      |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| model   | A fitted model object of class "oneinflmodel", "truncmodel", or "basicPoisson".                                                                                      |
| data    | A data frame containing the covariates used to fit the model.                                                                                                        |
| maxpred | Optional integer specifying the maximum count value for which to compute predicted frequencies. If not supplied, defaults to the maximum observed count in the data. |

**Details**

The function determines the model type based on its class and the dist attribute, and applies the appropriate density function:

- For oneinflmodel (Poisson): one-inflated positive Poisson distribution.
- For oneinflmodel (negbin): one-inflated zero-truncated negative binomial.
- For truncmodel (Poisson): truncated positive Poisson.
- For truncmodel (negbin): zero-truncated negative binomial.

**Value**

A numeric vector of length maxpred, giving the predicted expected frequency of each count from 1 to maxpred.

**See Also**

[feepplot](#), [fee](#), [dfree](#)

**Examples**

```
df <- data.frame(x = runif(10,0,10), d = sample(c(0,1), 10, replace=TRUE), y = rpois(10, 3) + 1)
model <- oneinfl::oneinfl(formula = y ~ x + d | x + d, df = df, dist = "Poisson")
feepred(model, data = df)
```

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