[FOR ONLINE PUBLICATION]

Supplementary Material for

Exploring Subjective Poverty Dynamics: Beyond the Minimum Income Question

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Methodological Notes

Estimating Subjective Poverty Lines using Binary Classification Methods

Key variable: *Ability to make ends meet (HS120):* "A household may have different sources of income and more than one household member may contribute to it. Thinking of your household's total income, is your household able to make ends meet, namely, to pay for its usual necessary expenses?"

1. With great difficulty
2. With difficulty
3. With some difficulty
4. Fairly easily
5. Easily
6. Very easily

Given the categorical nature of the data, the determination of who is classified as 'poor' is often arbitrary and typically made by researchers or policy-makers. We present results for two distinct scenarios:

1. Ability to make ends meet 'with great difficulty' or 'with difficulty' $[HS120 \leq 2]$
2. Ability to make ends meet 'with great difficulty' $[HS120 = 1]$

To determine the optimal cutpoint, we rely on a confusion matrix:

		Predicted condition		
		Positive	*Negative*	Total
Actual condition	*Positive*	True positive *(TP)*	False negative *(FN)*	$TP+FN$
	Negative	False positive *(FP)*	True negative *(TN)*	$FP+TN$
	Total	$TP+FP$	$FN+TN$	N

In particular, we utilize the following classification measures derived from the matrix:
Youden J index:

$$J = Se + Sp - 1 \tag{1}$$

The product of sensitivity and specificity:

$$Prod = Se \cdot Sp \tag{2}$$

The $F1$ score metric:

$$F1 = \frac{2 \cdot TP}{2 \cdot TP + FP + FN} \tag{3}$$

Cohen's *Kappa*:

$$\kappa = \frac{2(TP \cdot TN) - FN \cdot FP}{(TP + FP) \cdot (FP + TN) + (TP + FN) \cdot (FN + TN)} \tag{4}$$

Distance to the point [0,1] on ROC space (Euclidean's index):

$$ROC_{[0,1]} = \sqrt{(1 - Se)^2 + (1 - Sp)^2} \tag{5}$$

where:

Se is Sensitivity: $Se = \frac{TP}{TP+FN}$

Sp is Specificity: $Sp = \frac{TN}{TN+FP}$

In this Supplementary Material, we exclusively present results for single-adult households.

Identifying the Subjectively Poor Using Machine Learning Methods

We employ machine learning to classify households as subjectively 'poor' or 'non-poor', guided by the following approach:

1. In year T_0, we utilize the intersection method with the Minimum Income Question (MIQ) to assign the poverty status to each household.
2. Using the data from T_0, we train an ML model to classify households based on the following set of characteristics:

   Household income; household size; type of household; number of rooms available to the household; type of ownership of the dwelling; degree of urbanization; share of market income in total household income; share of adult females; share of adults with tertiary education; share of currently working adults; share of younger adults (aged 16–30); migrant origin; ability to make ends meet; financial burden of the total housing cost; a set of material deprivation indicators: leaking roof; ability to keep home adequately warm; bath or shower in dwelling; indoor flushing toilet; arrears on mortgage or rental payments; arrears on utility bills; capacity to afford paying for one week annual holiday; capacity

to afford a meal with meat; capacity to face unexpected financial expenses; a telephone; a colour TV; a computer; a washing machine; a car; replacing worn-out furniture; too dark dwelling; noise from the street/neighbours; pollution or grime; crime, violence of vandalism; replace worn-out clothes; two pairs of shoes; get-together with friends/family; regularly participate in a leisure activity; spend a small amount of money each week on yourself; internet connection at home.

3. We then apply the train model to predict subjective poverty status in years T_1 to T_5.

In this Supplementary Material, we exclusively present results for *neural networks*. Hyperparameters were systematically explored using grid search with the following inputs:

- number of neurons in hidden layers: [32, 64, 128, 256]
- number of hidden layers: [1, 2, 3, 4, 5, 6, 7, 8]
- learning rate: [0.001, 0.005, 0.01]

Besides neural networks, we trained additional models (not reported in the Supplementary Material). Hyperparameters were systematically explored using grid search with the following inputs:

- *Decision tree classifier*
  - Function to measure the quality of a split: [‘gini’, ‘entropy’]
  - Maximum depth of the tree: [0, 3, 5, 10, 15, 20, 25, 30, 40]
  - Minimum number of samples required to split an internal node: [2, 3, 5, 10, 15, 20, 25, 30]
  - Minimum number of samples required to be at a leaf node: [1, 2, 4, 6, 8, 10]
- *Random forest*
  - Number of trees in the forest: [100, 150, 200, 250]
  - Function to measure the quality of a split: [‘gini’, ‘entropy’]
  - Maximum depth of the trees: [10, 15, 20]
  - Minimum number of samples required to split an internal node: [2, 3, 5, 10]
  - Minimum number of samples required to be at a leaf node: [2, 4, 6]
- *k-nearest neighbors*
  - Number of neighbors: [3, 5, 7, 9]
  - Weight function used in prediction: [‘uniform’, ‘distance’]
  - Power parameter for the Minkowski metric: [1, 2]
- *Logistic Regression*
  - Regularization strength: [0.001, 0.01, 0.1, 1, 10, 100]

- Type of regularization: [‘none’, ‘l2’]
- Algorithm to use in the optimization problem: [‘saga’, ‘lbfgs’]
- Maximum number of iterations: [10000]

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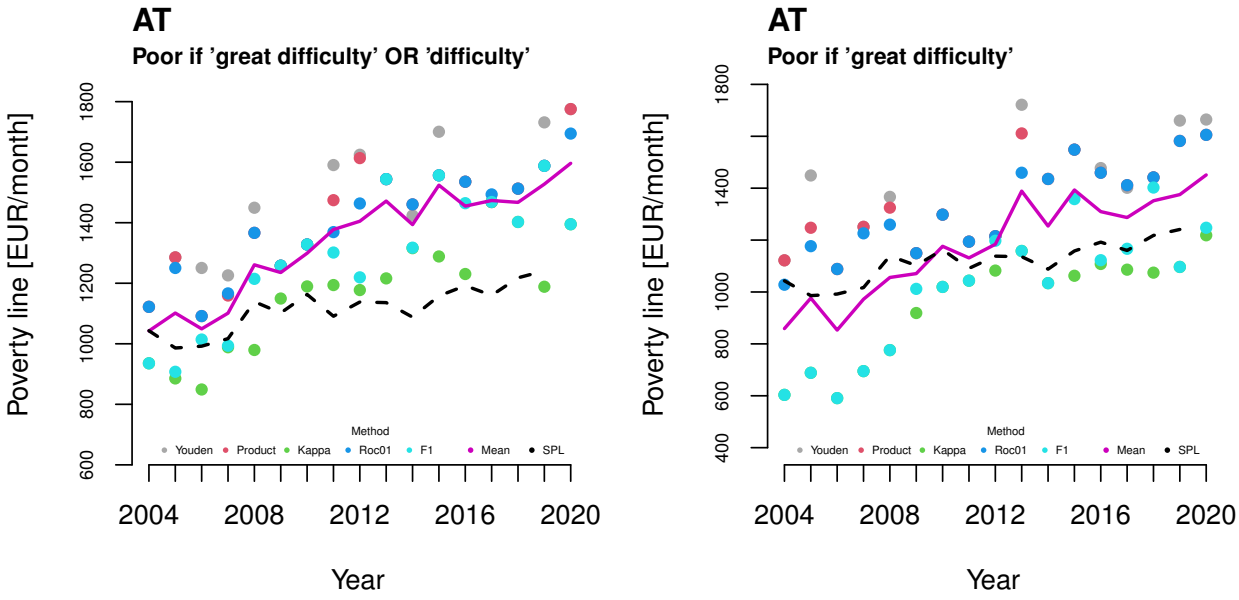

Figure S.1: Estimated cutpoints from multiple binary classification methods *(Austria)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
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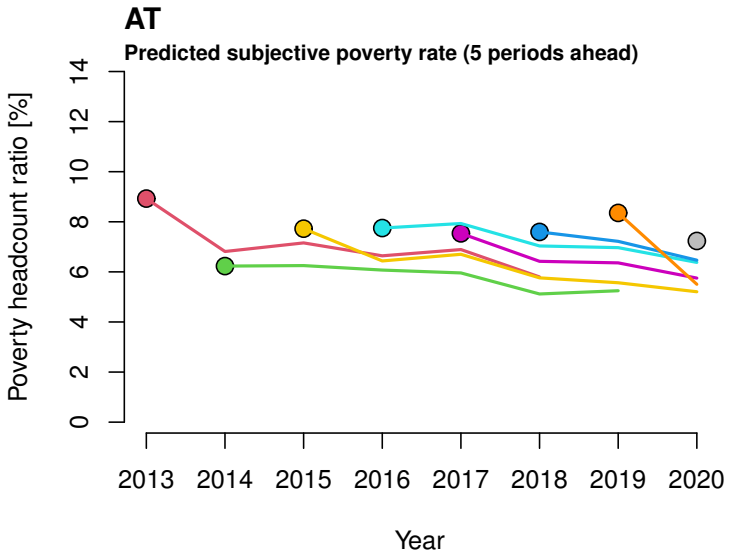

Figure S.2: Predicted subjective poverty rate: neural network model analysis *(Austria)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

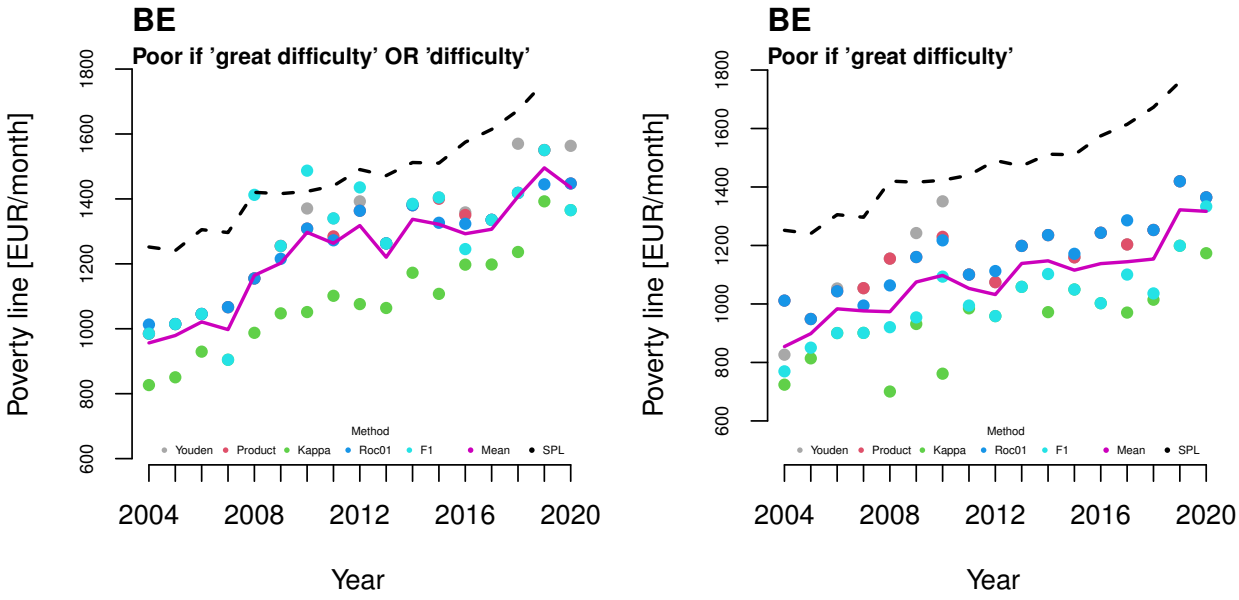

Figure S.3: Estimated cutpoints from multiple binary classification methods *(Belgium)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
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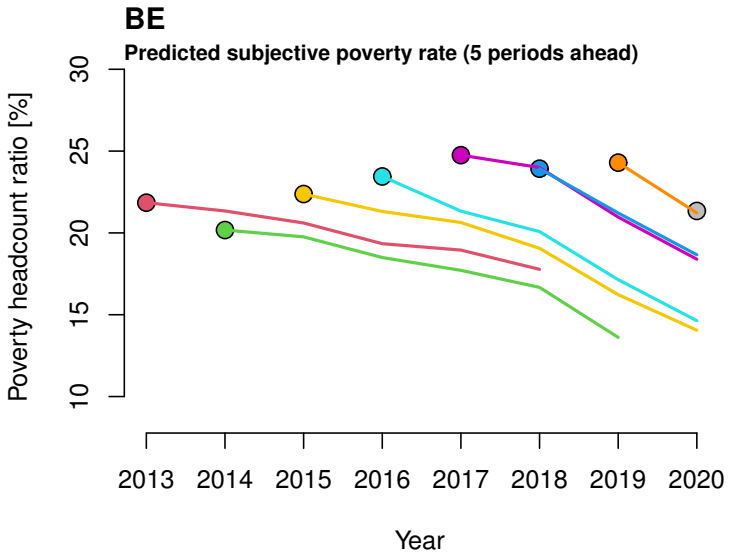

Figure S.4: Predicted subjective poverty rate: neural network model analysis *(Belgium)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
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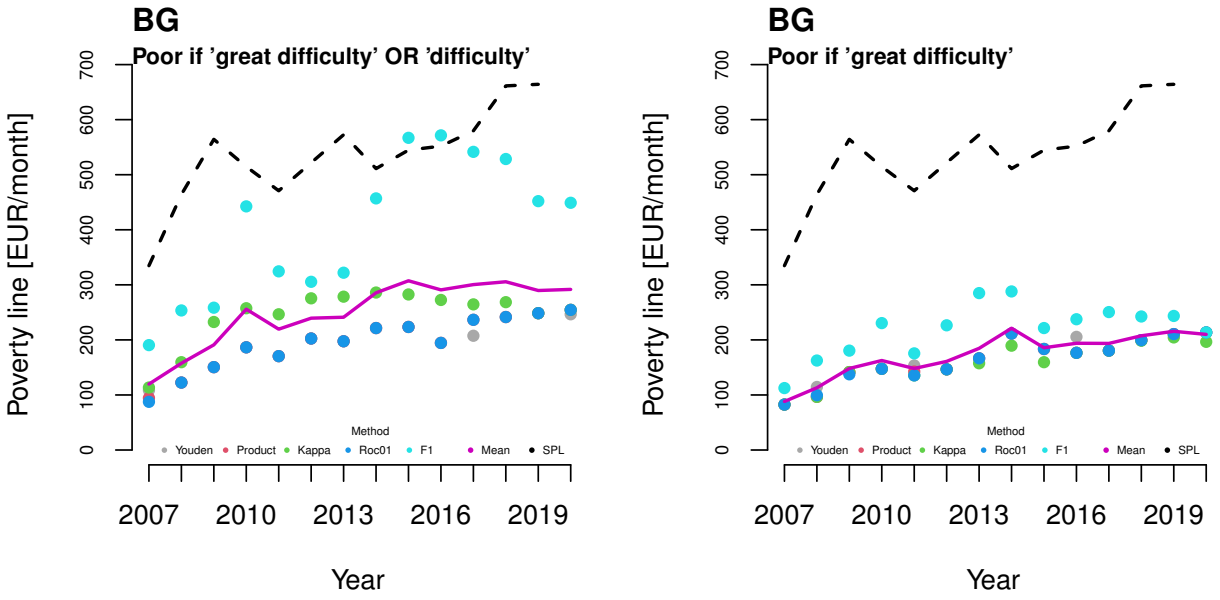

Figure S.5: Estimated cutpoints from multiple binary classification methods *(Bulgaria)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
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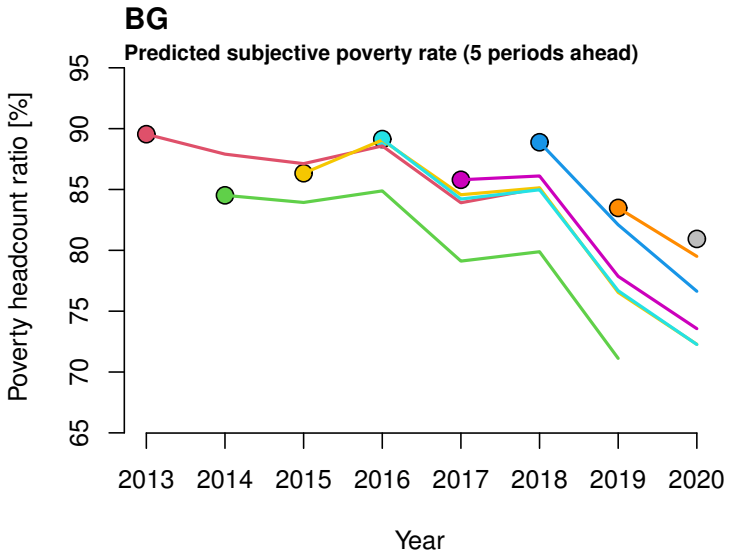

Figure S.6: Predicted subjective poverty rate: neural network model analysis *(Bulgaria)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
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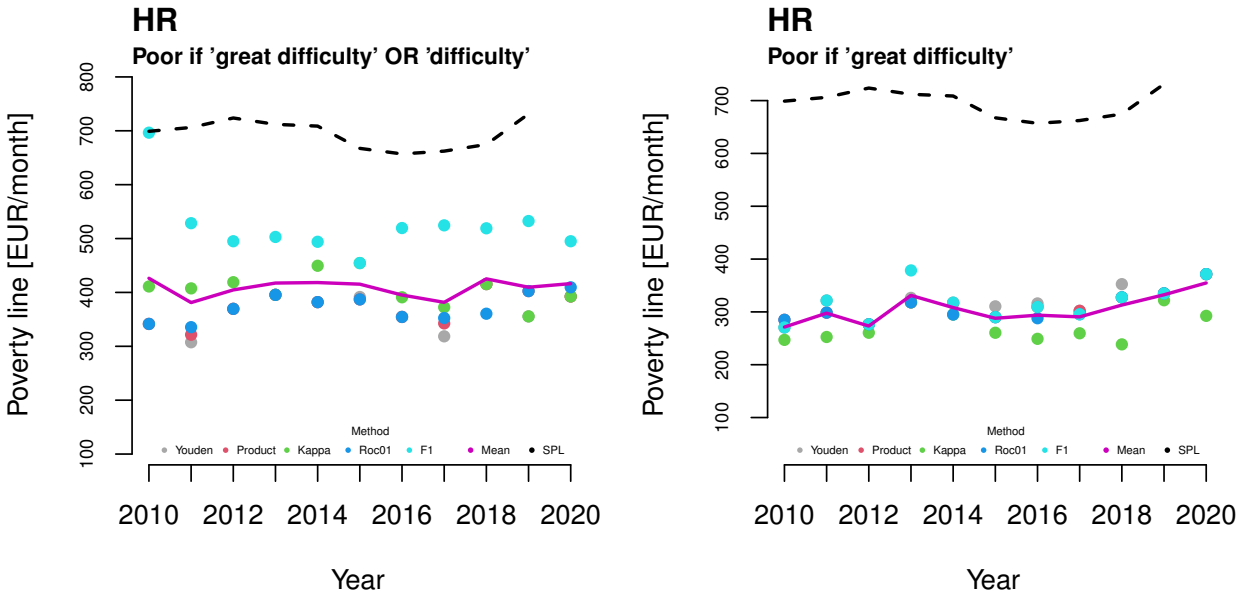

Figure S.7: Estimated cutpoints from multiple binary classification methods *(Croatia)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
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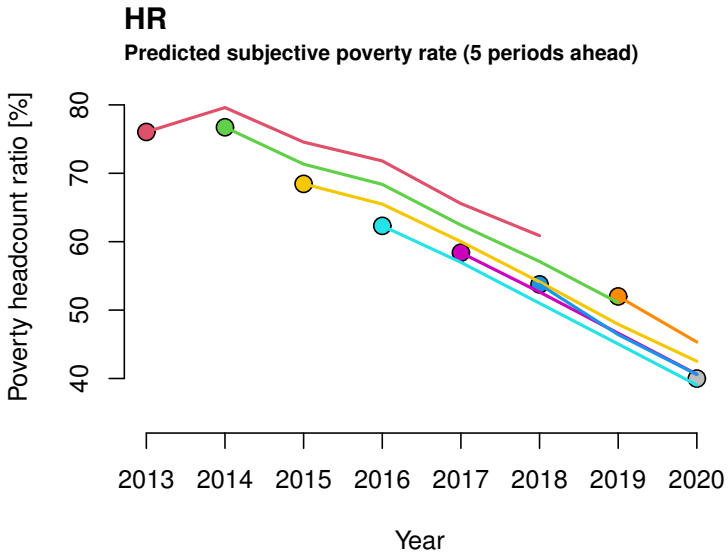

Figure S.8: Predicted subjective poverty rate: neural network model analysis *(Croatia)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
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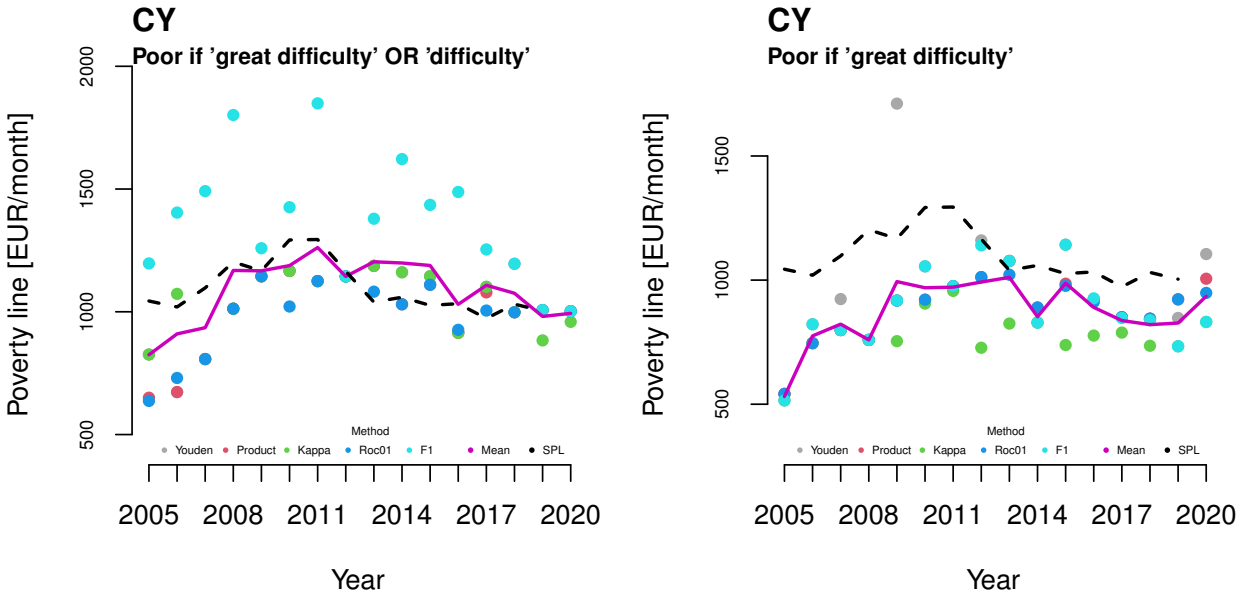

Figure S.9: Estimated cutpoints from multiple binary classification methods *(Cyprus)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
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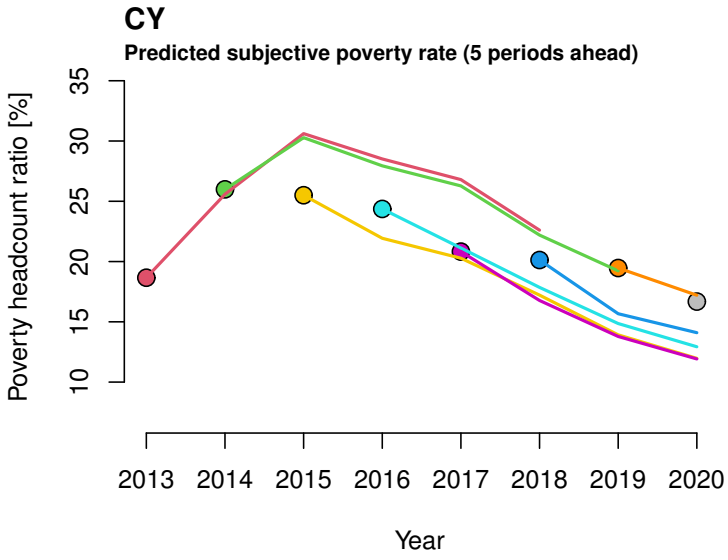

Figure S.10: Predicted subjective poverty rate: neural network model analysis *(Cyprus)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
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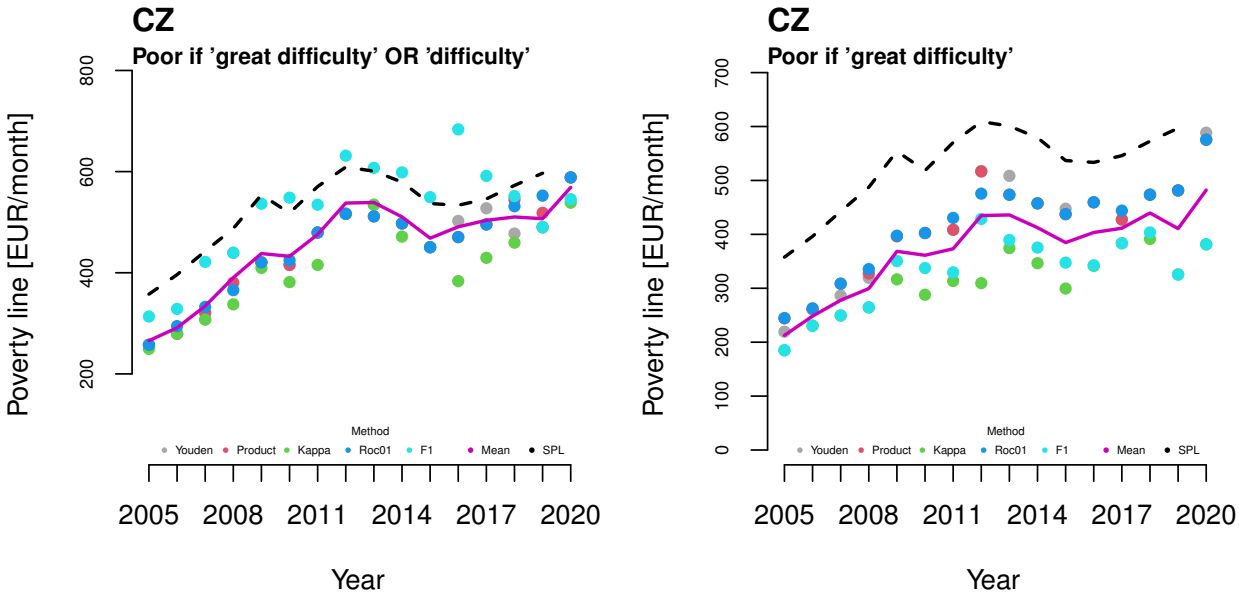

Figure S.11: Estimated cutpoints from multiple binary classification methods *(Czechia)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
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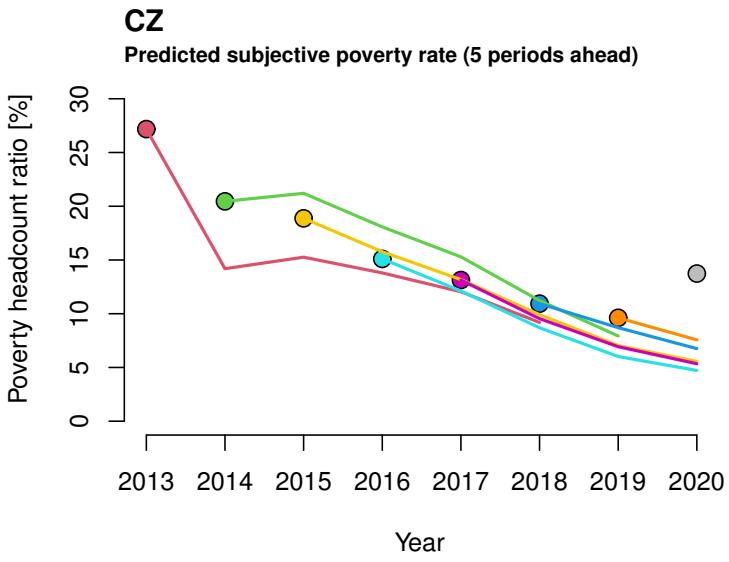

Figure S.12: Predicted subjective poverty rate: neural network model analysis *(Czechia)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
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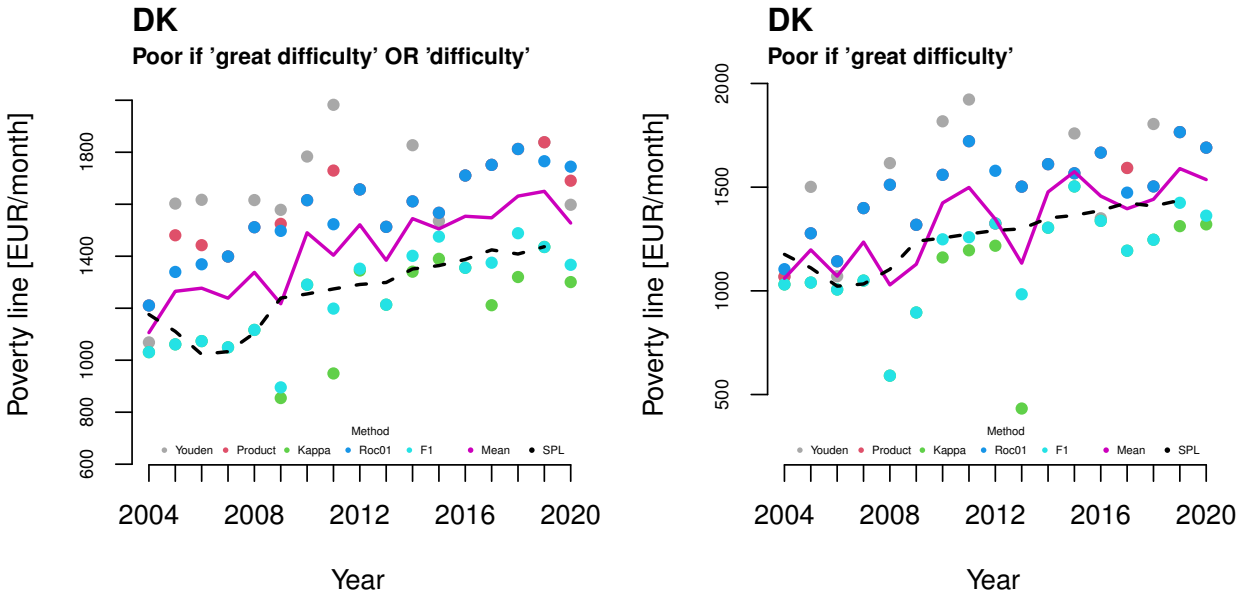

Figure S.13: Estimated cutpoints from multiple binary classification methods *(Denmark)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

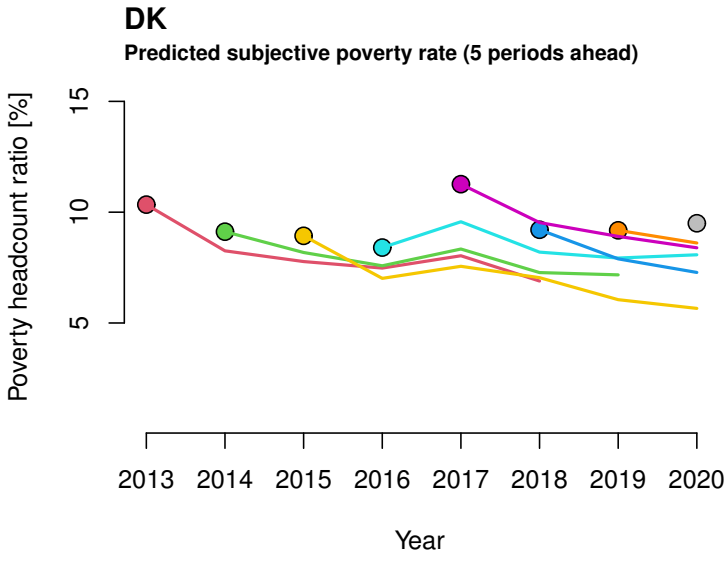

Figure S.14: Predicted subjective poverty rate: neural network model analysis *(Denmark)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

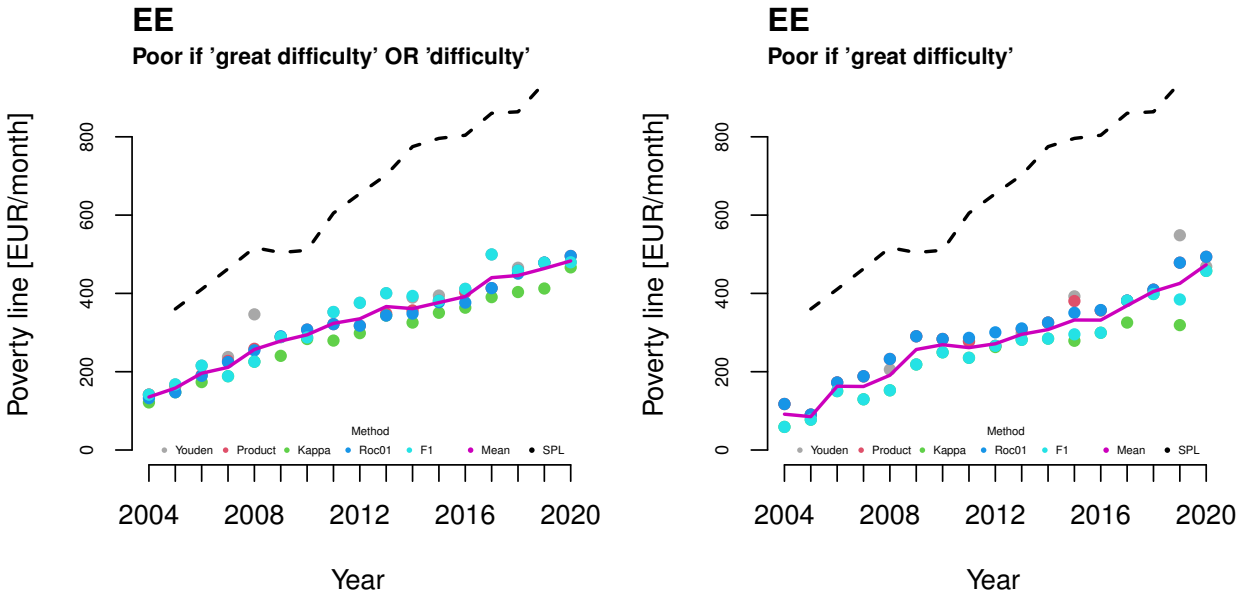

Figure S.15: Estimated cutpoints from multiple binary classification methods *(Estonia)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
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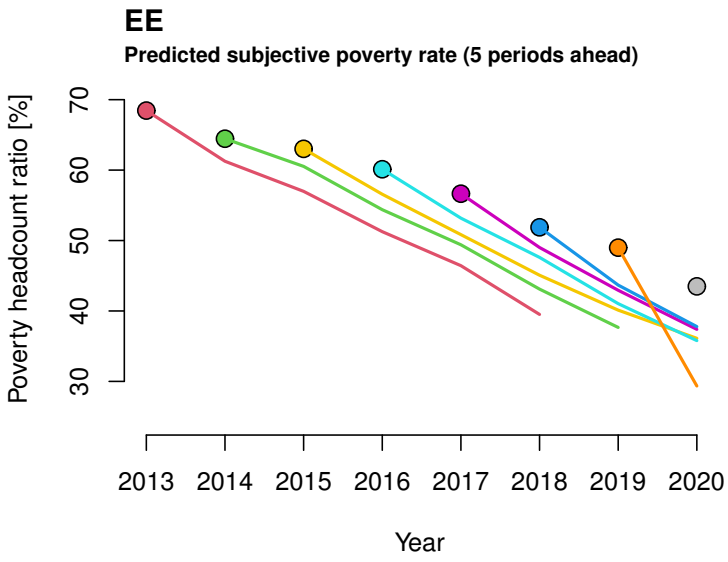

Figure S.16: Predicted subjective poverty rate: neural network model analysis *(Estonia)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
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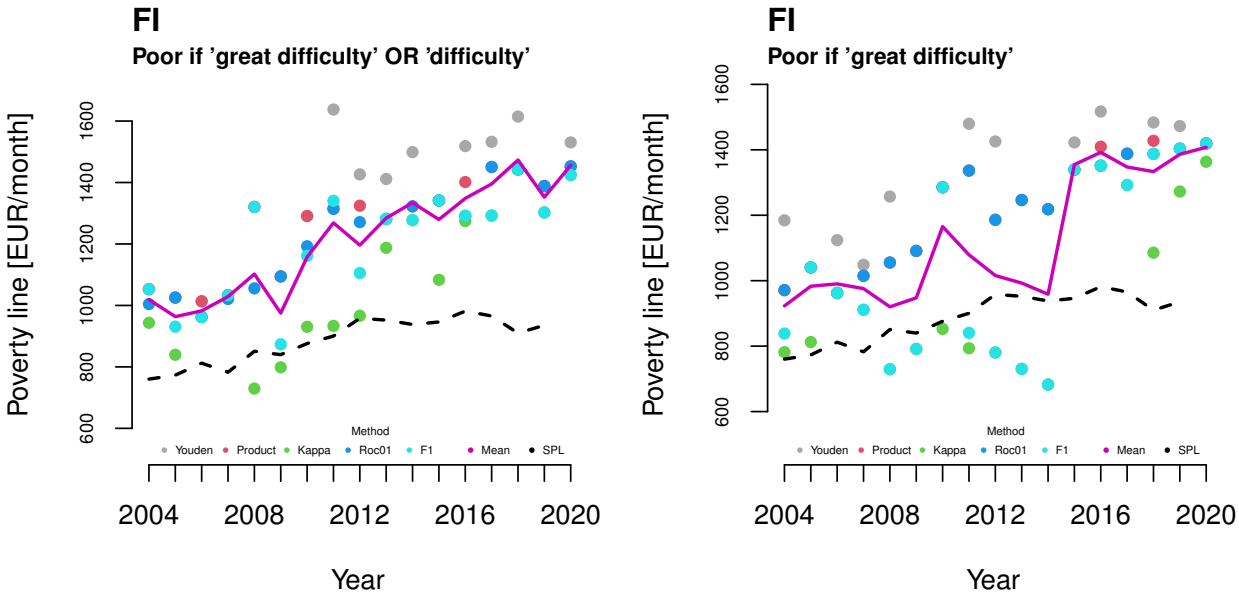

Figure S.17: Estimated cutpoints from multiple binary classification methods *(Finland)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
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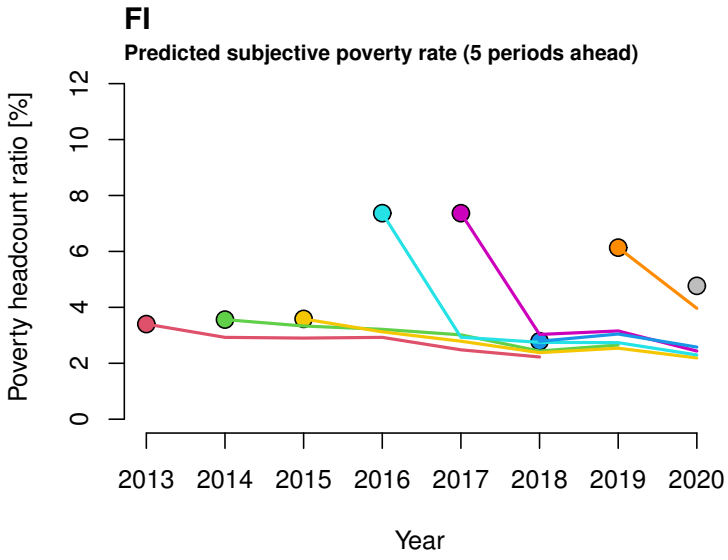

Figure S.18: Predicted subjective poverty rate: neural network model analysis *(Finland)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

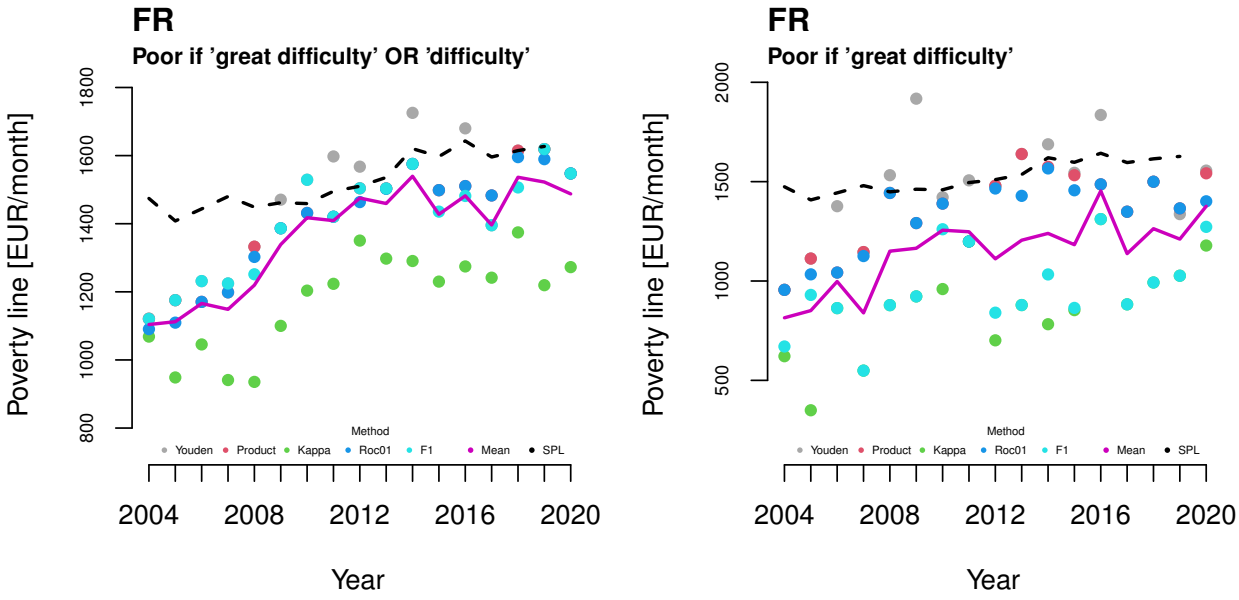

Figure S.19: Estimated cutpoints from multiple binary classification methods *(France)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

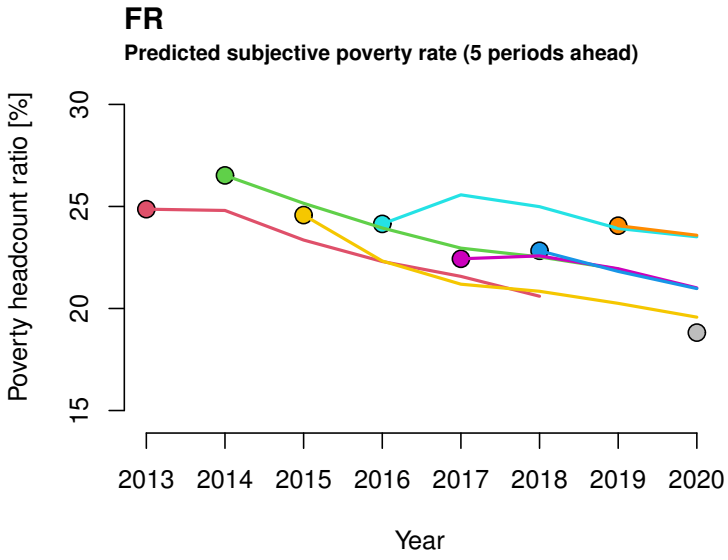

Figure S.20: Predicted subjective poverty rate: neural network model analysis *(France)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

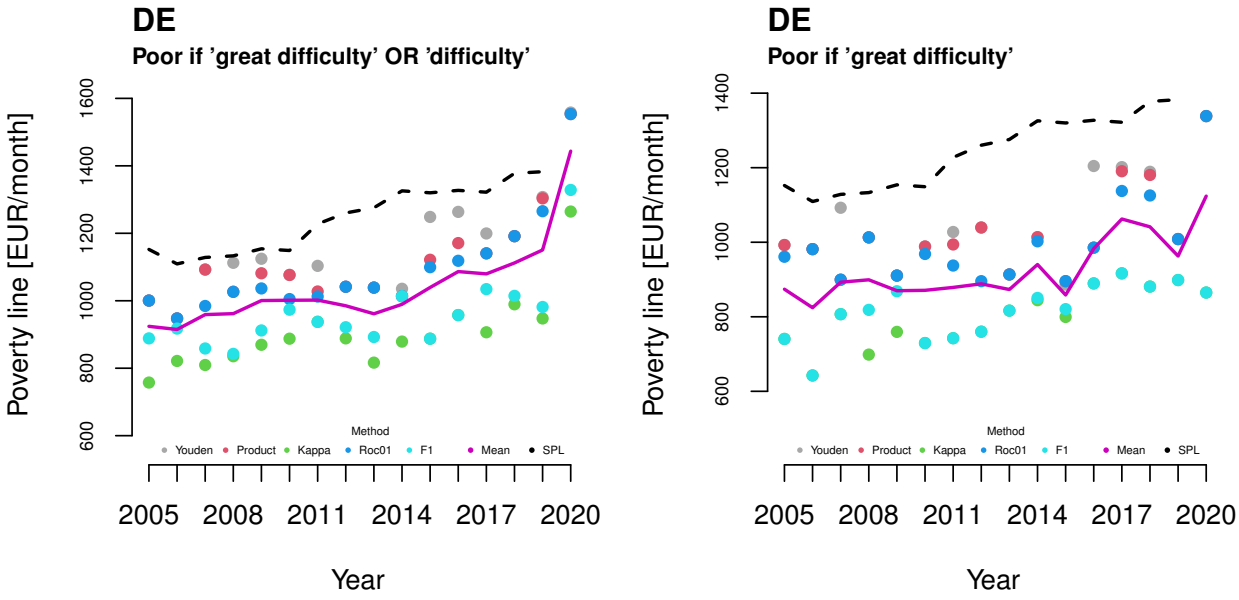

Figure S.21: Estimated cutpoints from multiple binary classification methods *(Germany)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

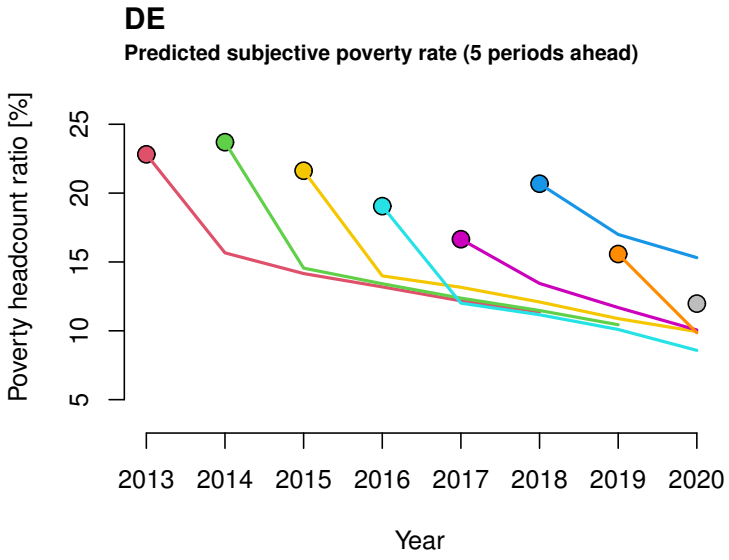

Figure S.22: Predicted subjective poverty rate: neural network model analysis *(Germany)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

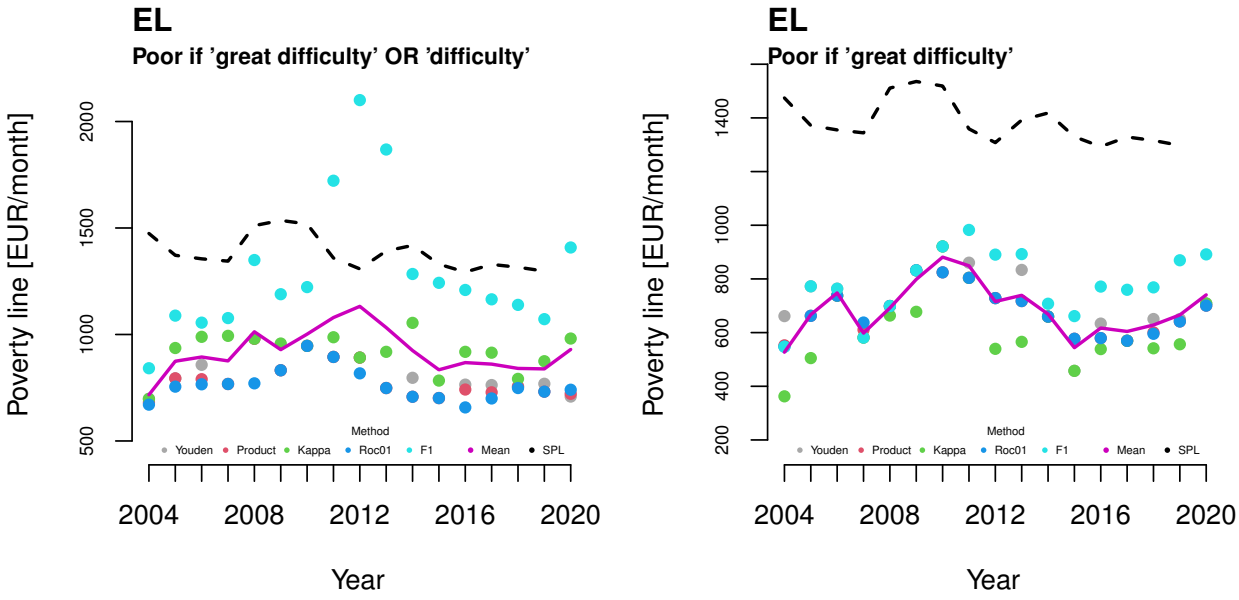

Figure S.23: Estimated cutpoints from multiple binary classification methods *(Greece)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

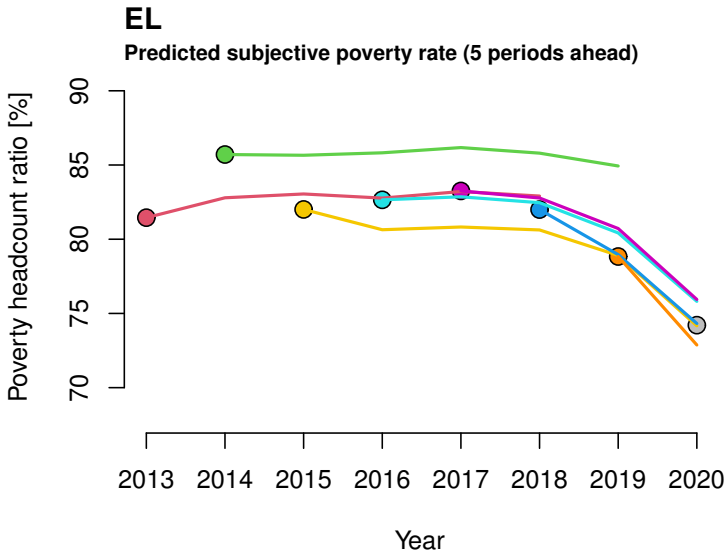

Figure S.24: Predicted subjective poverty rate: neural network model analysis *(Greece)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

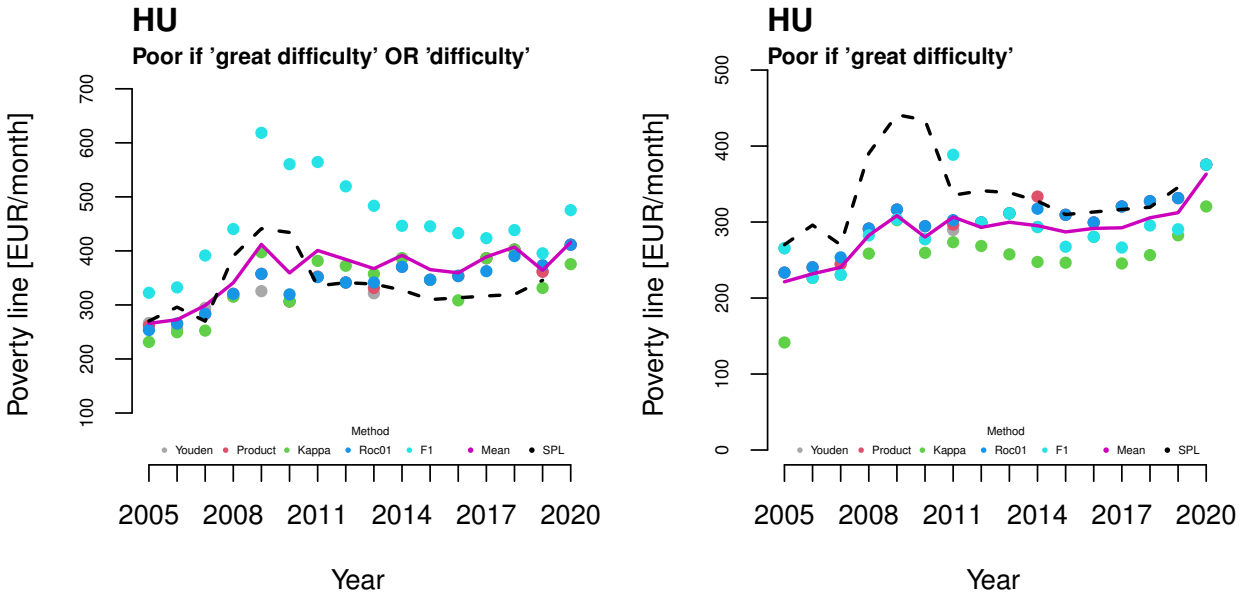

Figure S.25: Estimated cutpoints from multiple binary classification methods *(Hungary)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

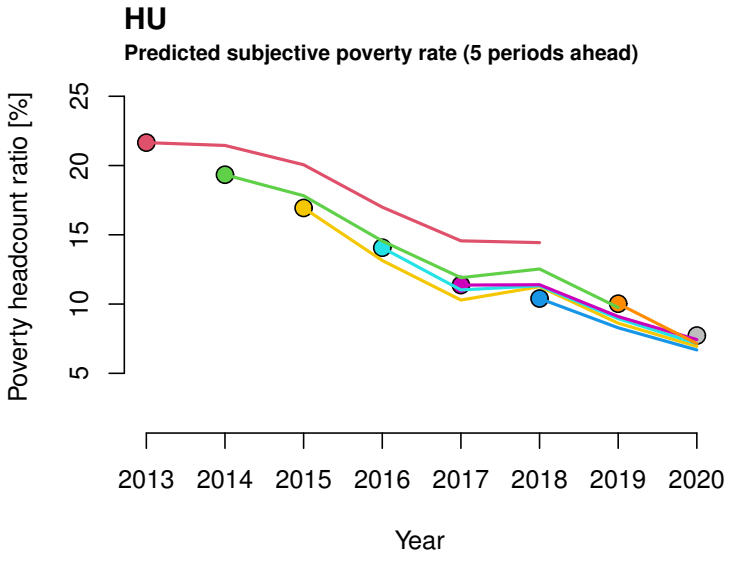

Figure S.26: Predicted subjective poverty rate: neural network model analysis *(Hungary)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

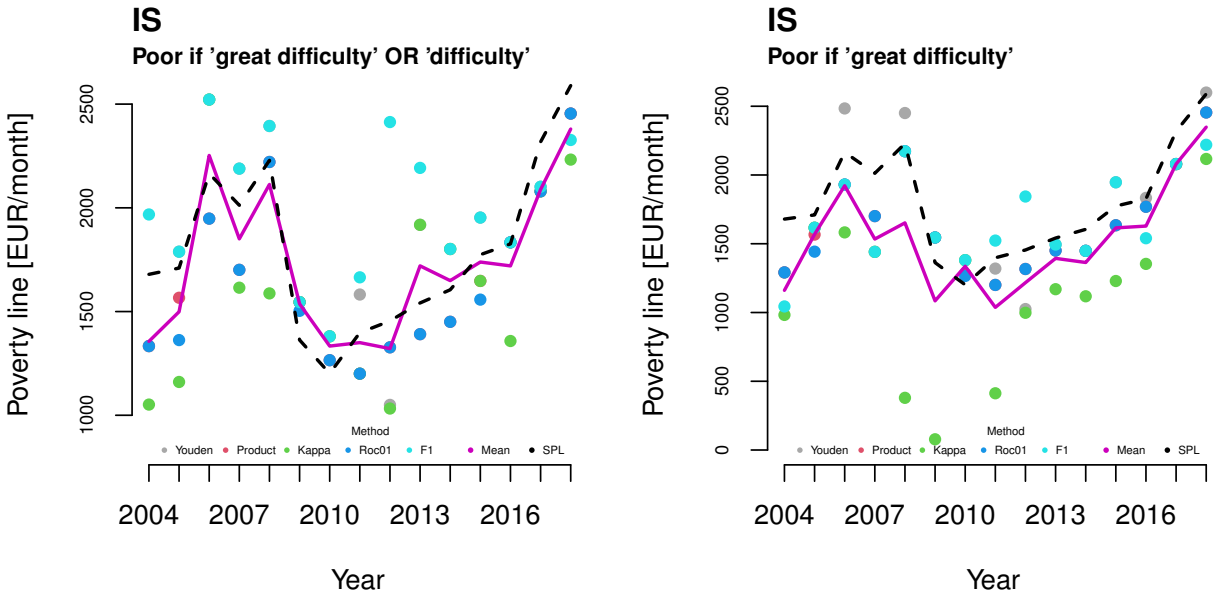

Figure S.27: Estimated cutpoints from multiple binary classification methods *(Iceland)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

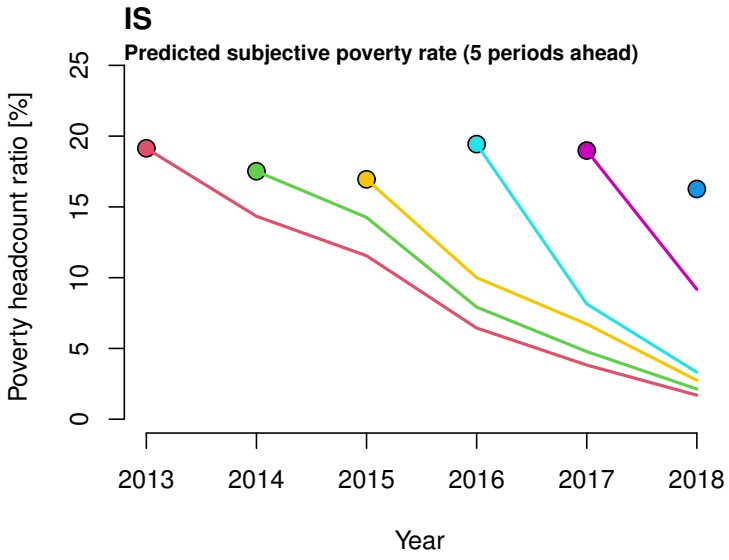

Figure S.28: Predicted subjective poverty rate: neural network model analysis *(Iceland)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

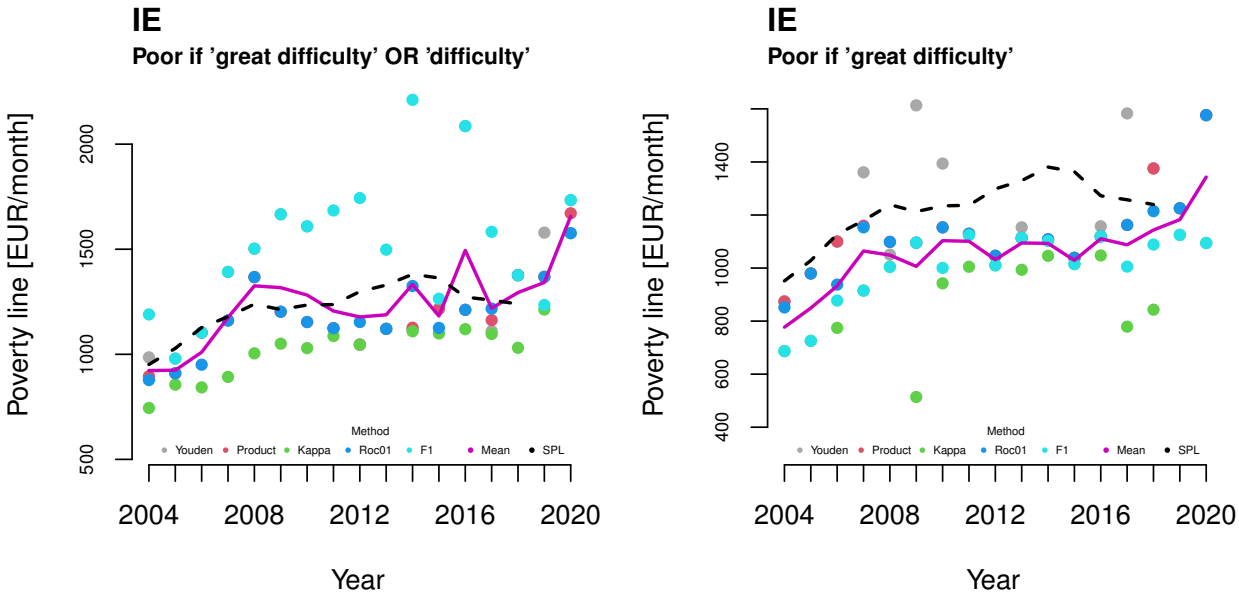

Figure S.29: Estimated cutpoints from multiple binary classification methods *(Ireland)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

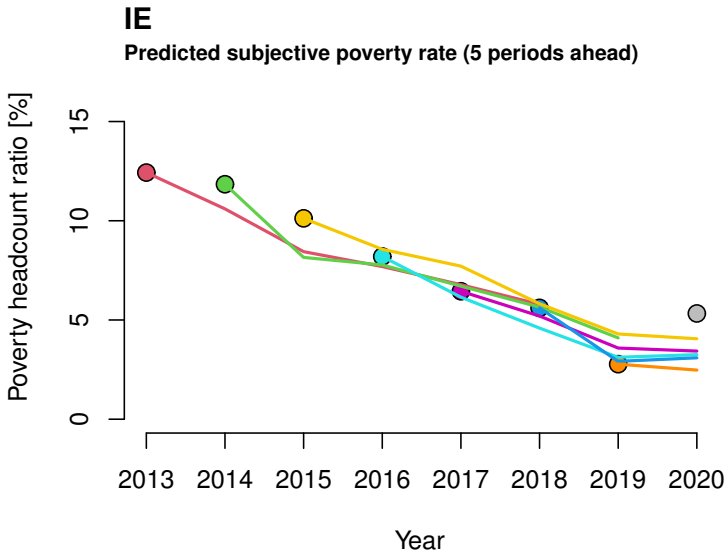

Figure S.30: Predicted subjective poverty rate: neural network model analysis *(Ireland)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

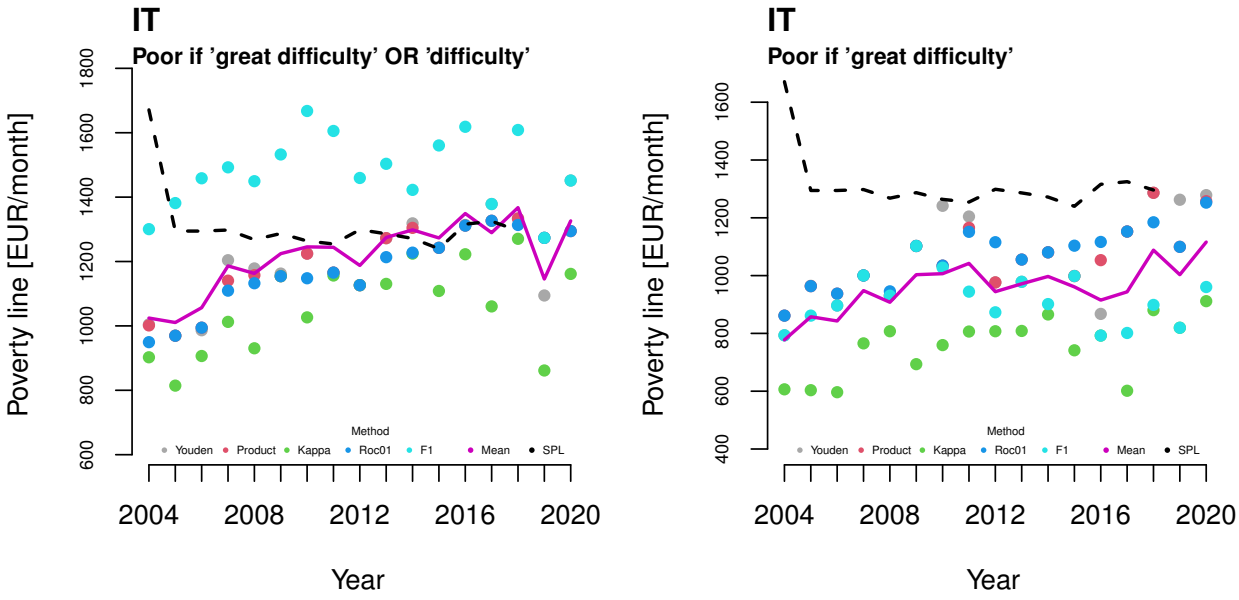

Figure S.31: Estimated cutpoints from multiple binary classification methods *(Italy)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

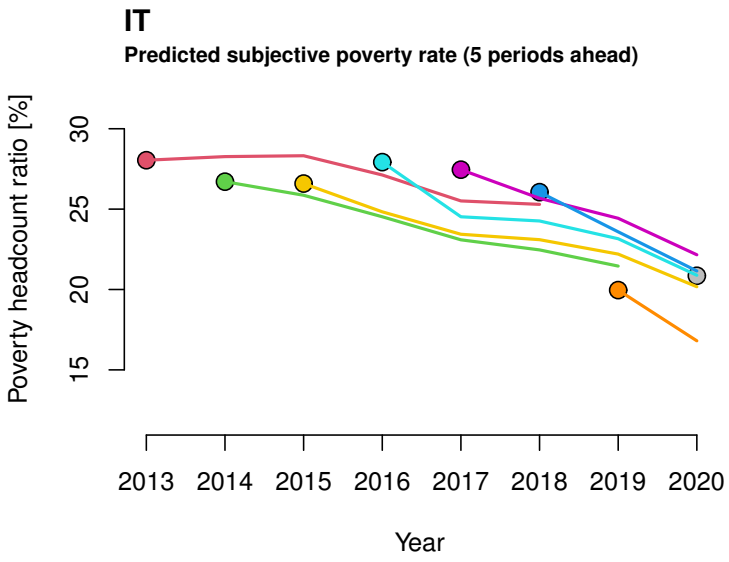

Figure S.32: Predicted subjective poverty rate: neural network model analysis *(Italy)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

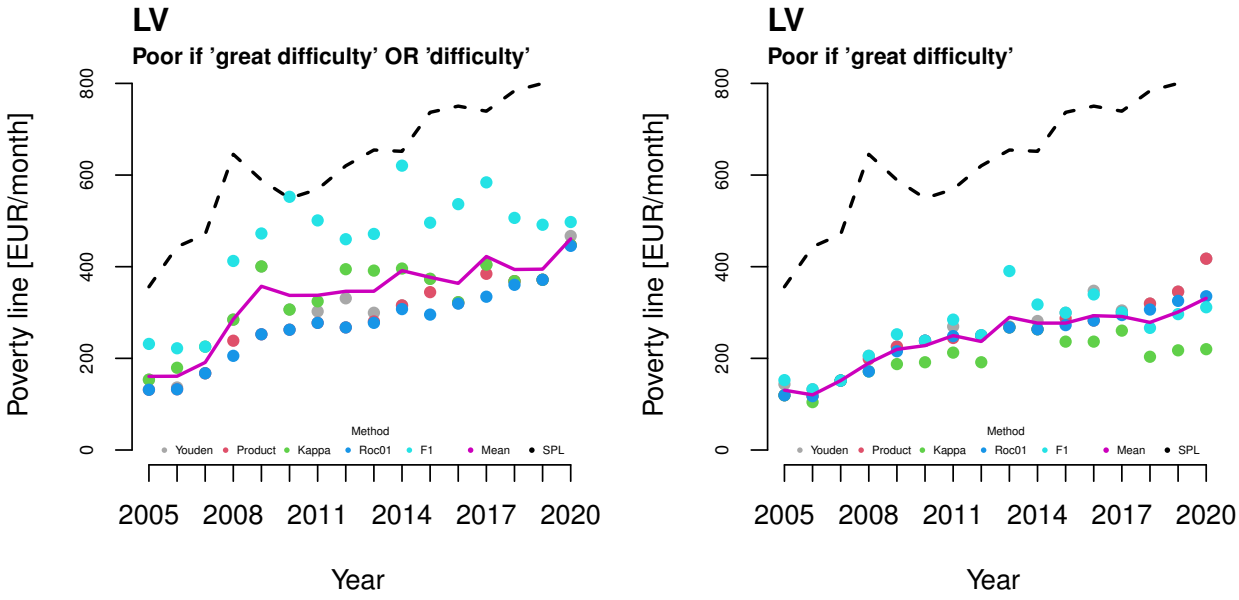

Figure S.33: Estimated cutpoints from multiple binary classification methods *(Latvia)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

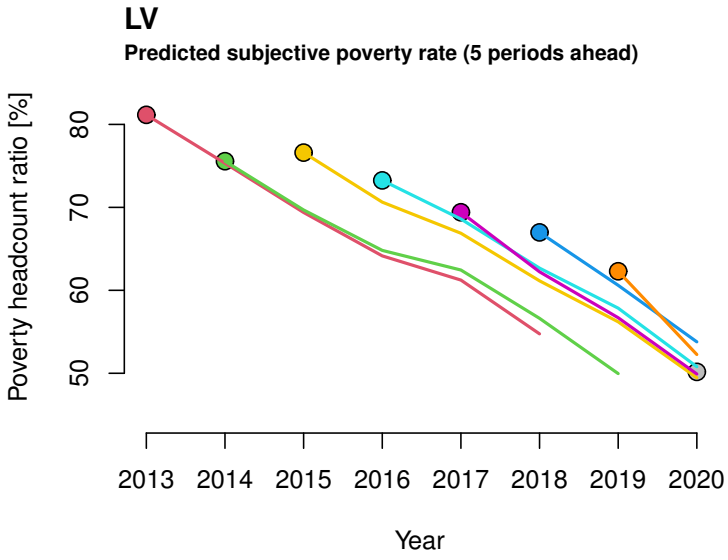

Figure S.34: Predicted subjective poverty rate: neural network model analysis *(Latvia)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

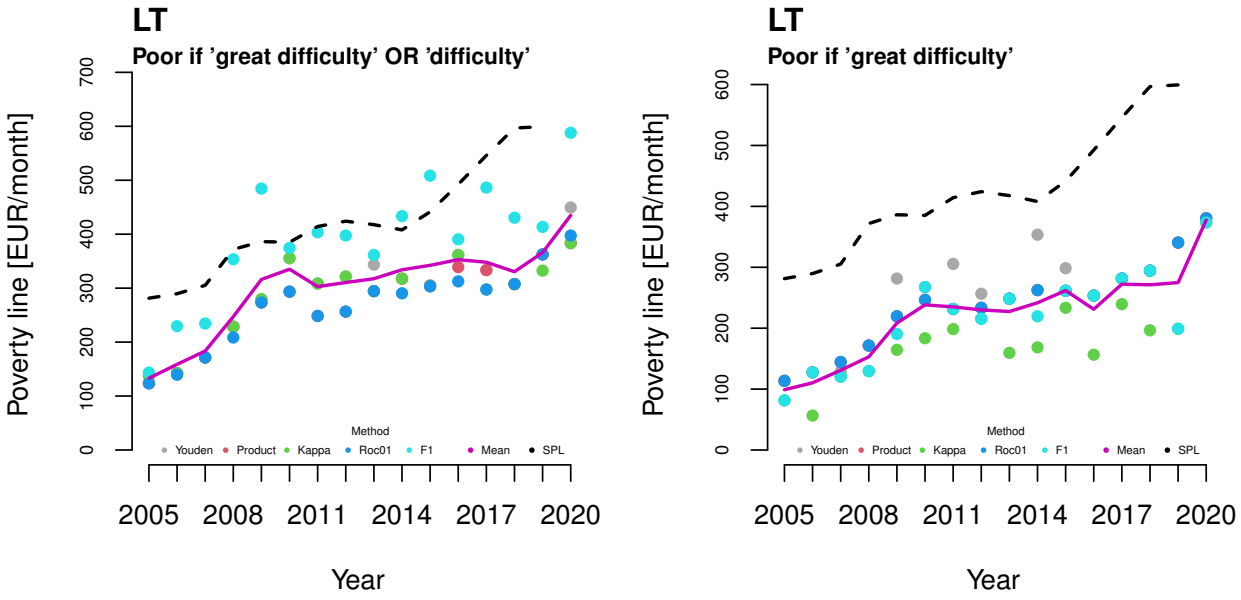

Figure S.35: Estimated cutpoints from multiple binary classification methods *(Lithuania)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

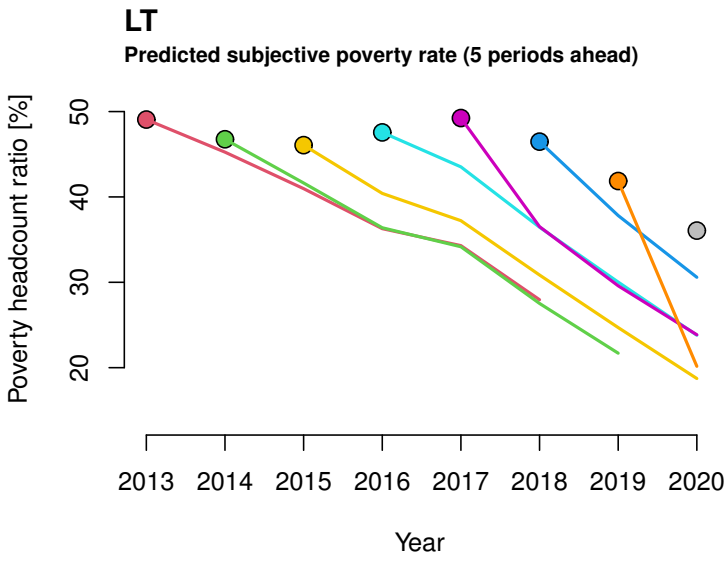

Figure S.36: Predicted subjective poverty rate: neural network model analysis *(Lithuania)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

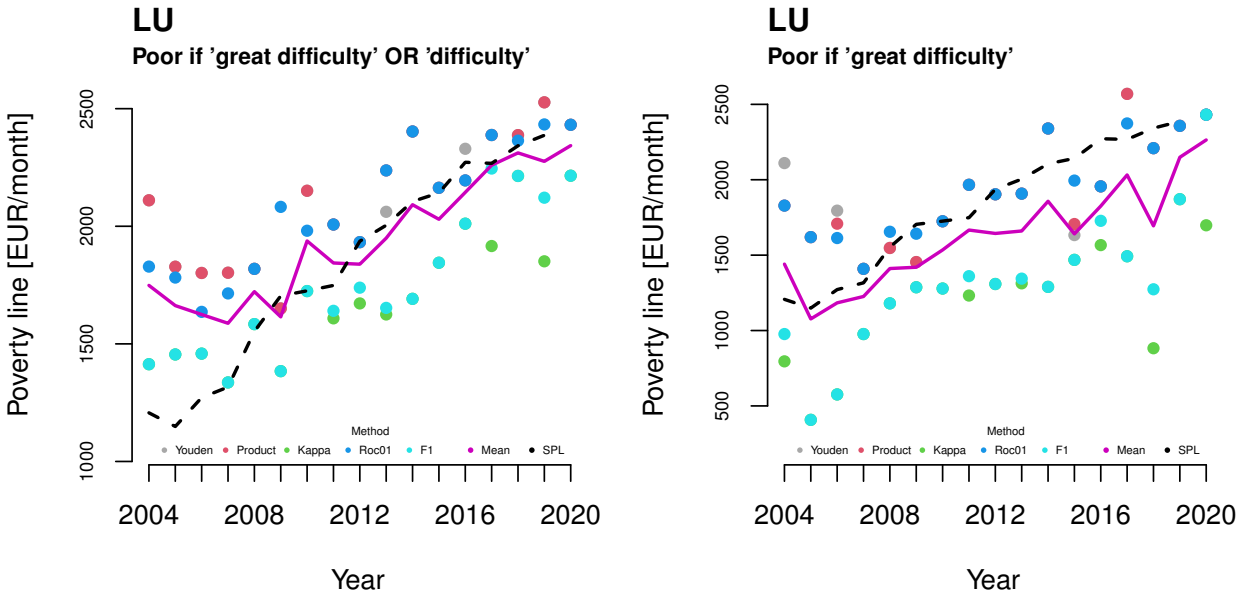

Figure S.37: Estimated cutpoints from multiple binary classification methods *(Luxembourg)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

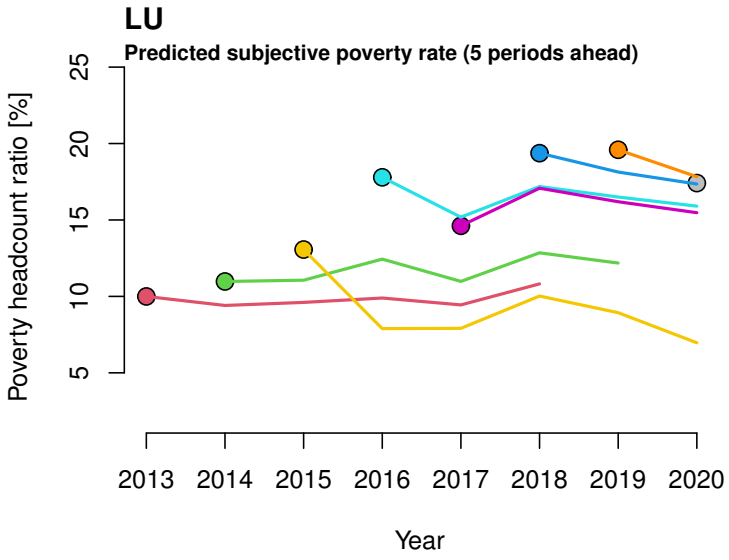

Figure S.38: Predicted subjective poverty rate: neural network model analysis *(Luxembourg)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

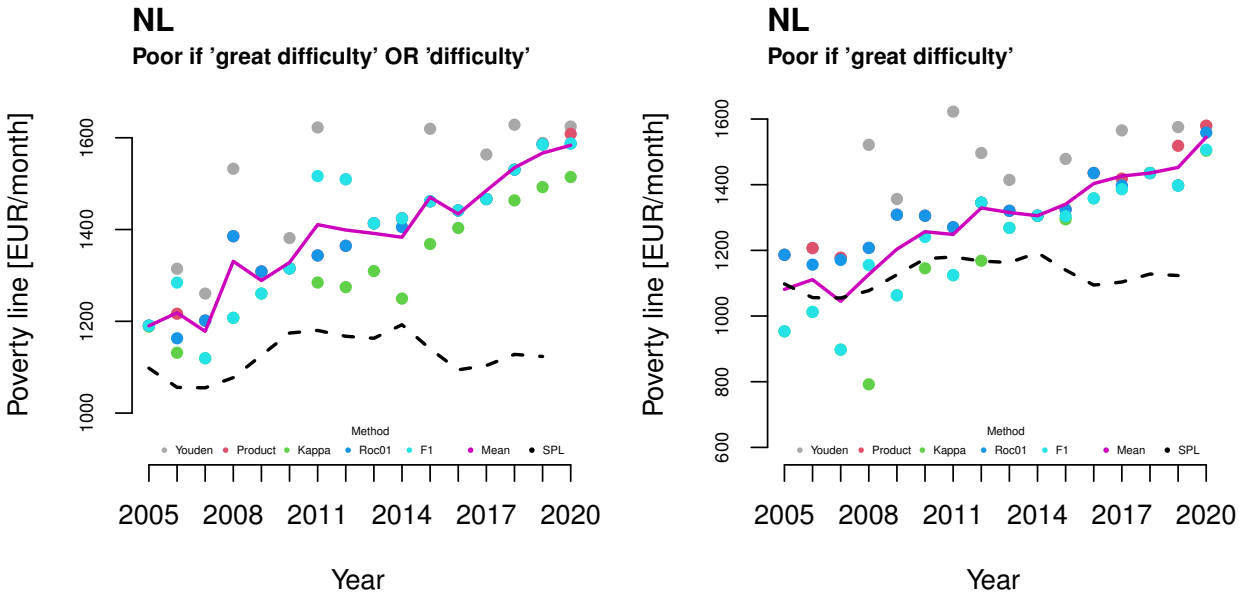

Figure S.39: Estimated cutpoints from multiple binary classification methods *(Netherlands)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

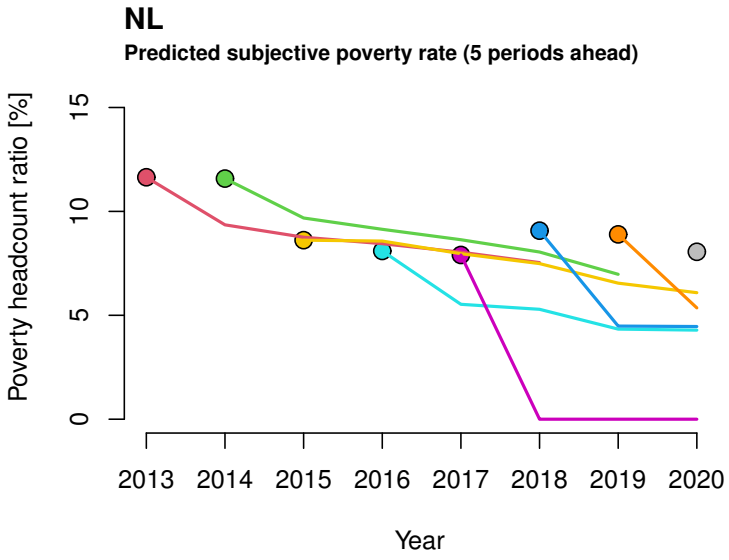

Figure S.40: Predicted subjective poverty rate: neural network model analysis *(Netherlands)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

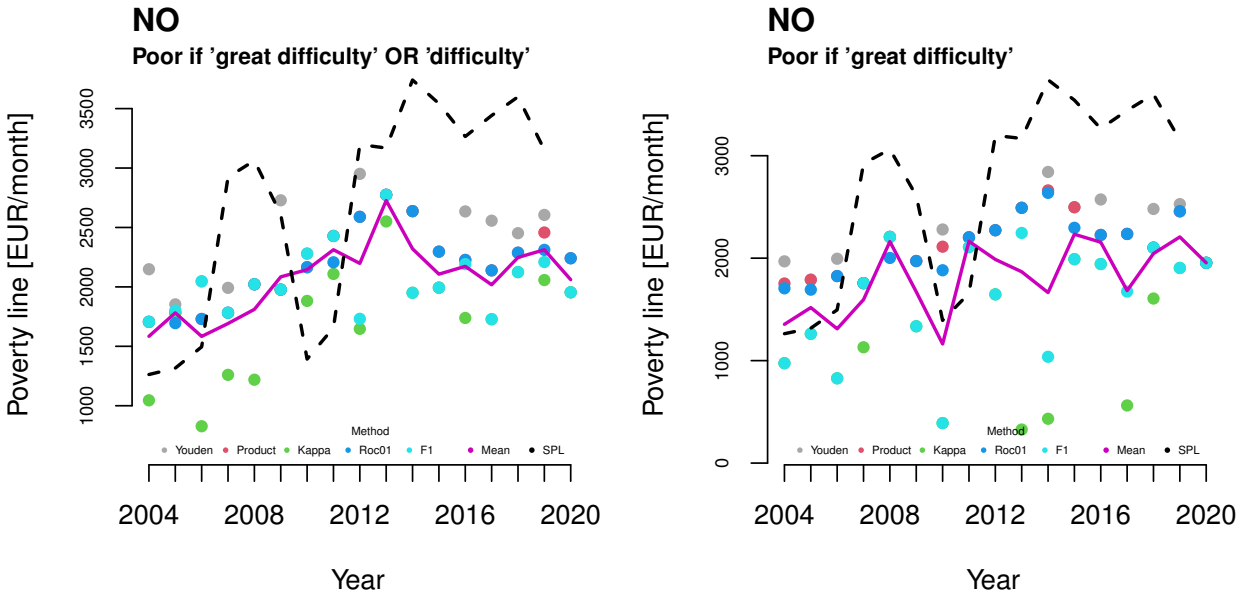

Figure S.41: Estimated cutpoints from multiple binary classification methods *(Norway)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

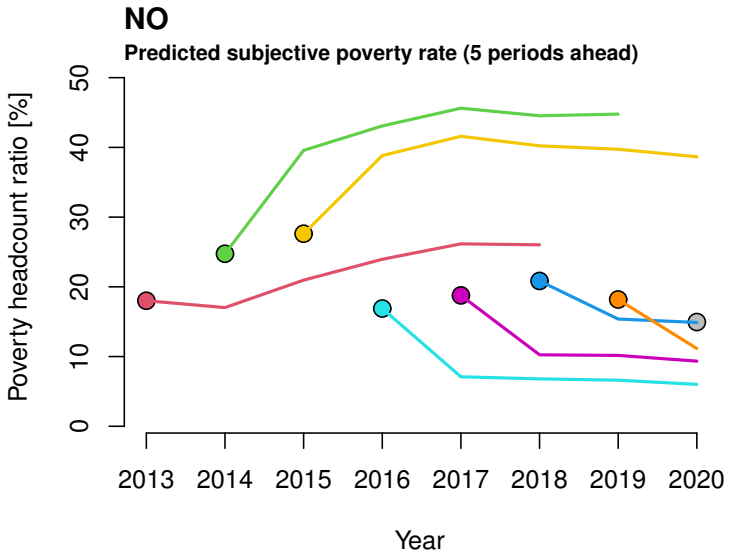

Figure S.42: Predicted subjective poverty rate: neural network model analysis *(Norway)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

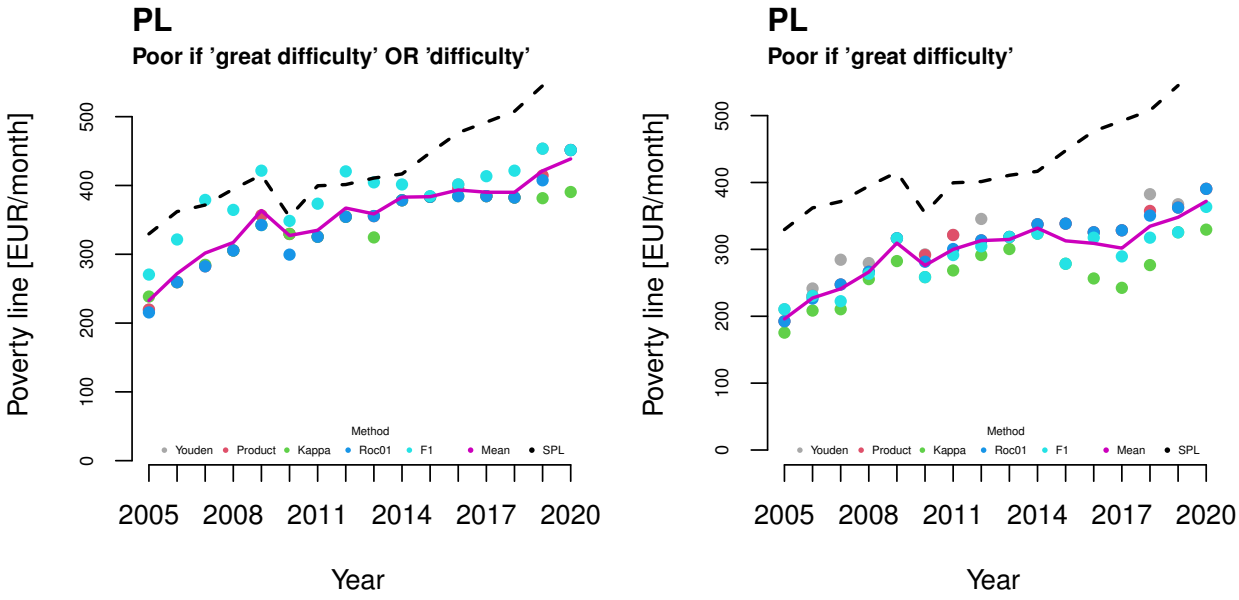

Figure S.43: Estimated cutpoints from multiple binary classification methods *(Poland)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

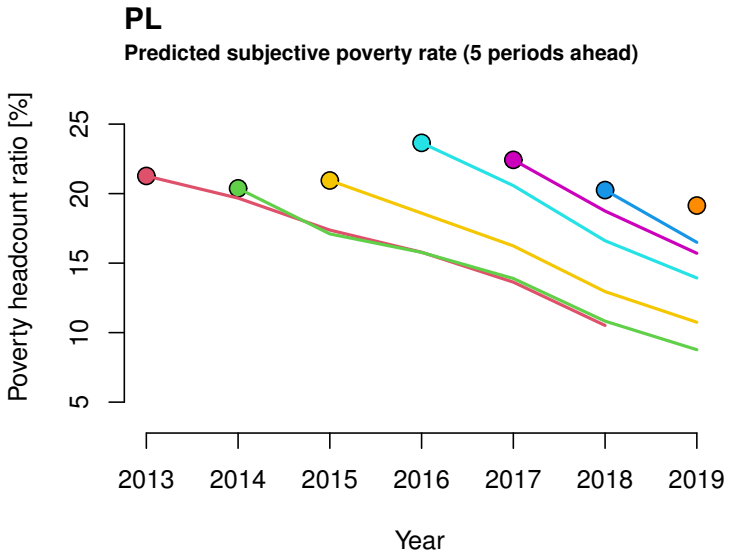

Figure S.44: Predicted subjective poverty rate: neural network model analysis *(Poland)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

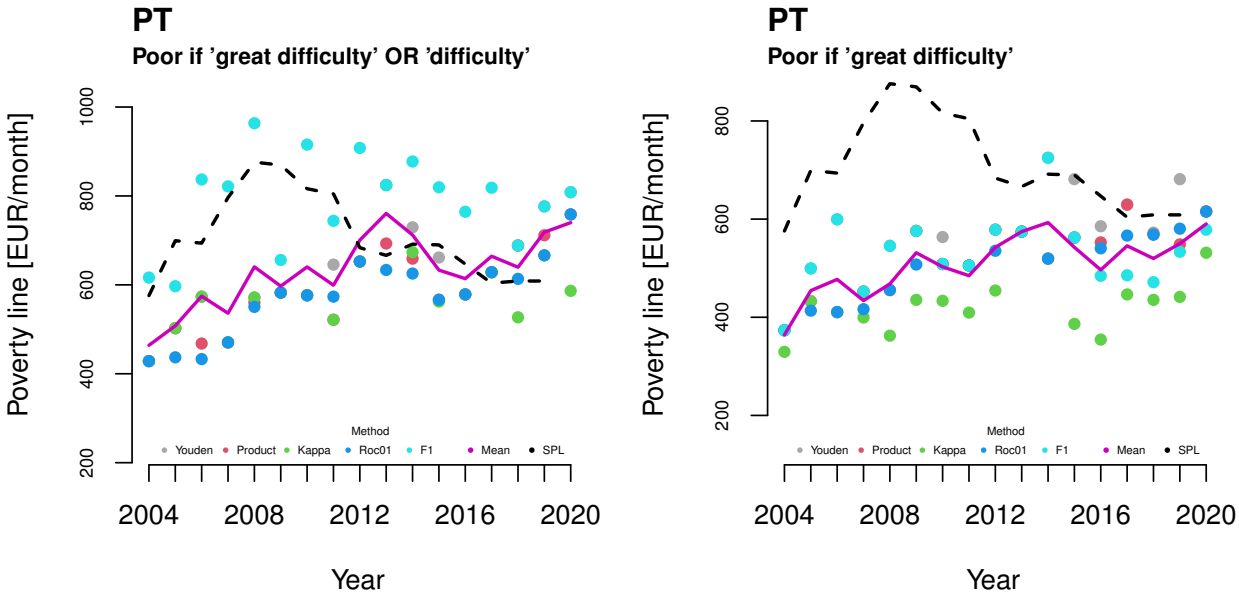

Figure S.45: Estimated cutpoints from multiple binary classification methods *(Portugal)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

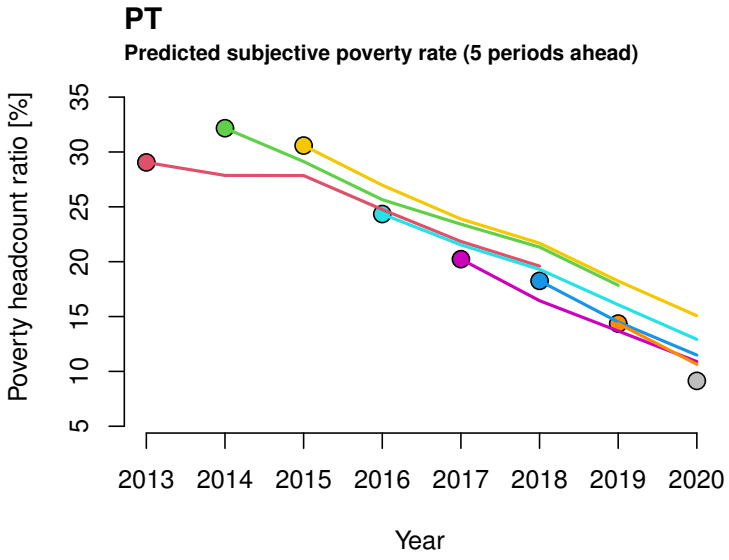

Figure S.46: Predicted subjective poverty rate: neural network model analysis *(Portugal)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

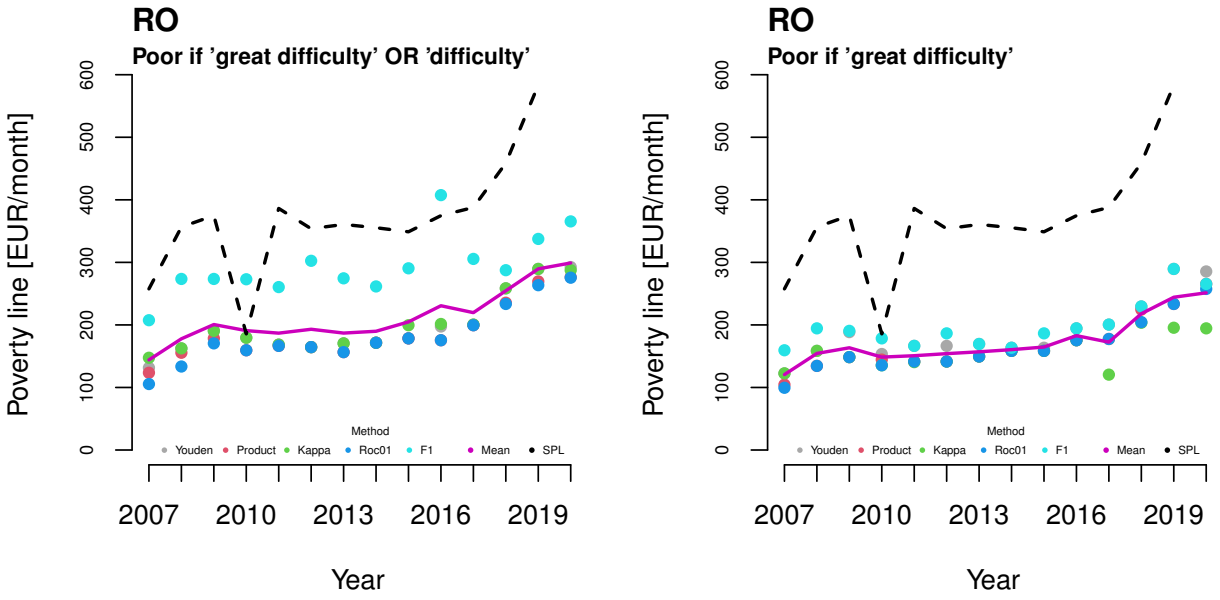

Figure S.47: Estimated cutpoints from multiple binary classification methods *(Romania)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

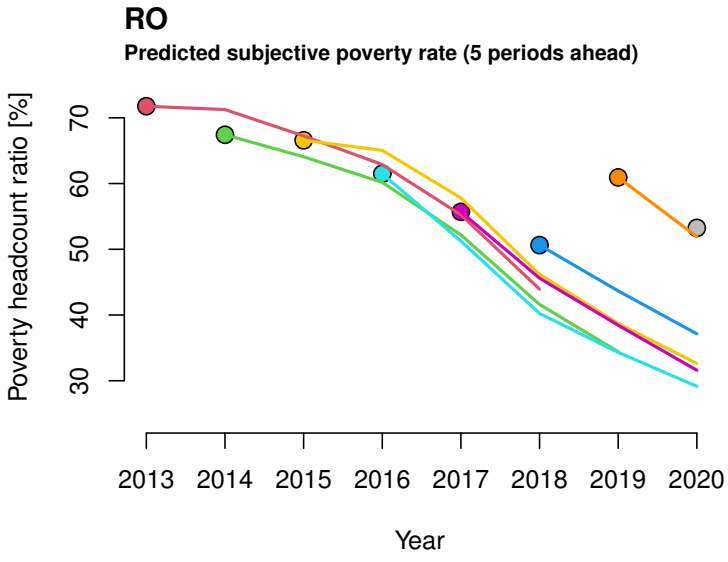

Figure S.48: Predicted subjective poverty rate: neural network model analysis *(Romania)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

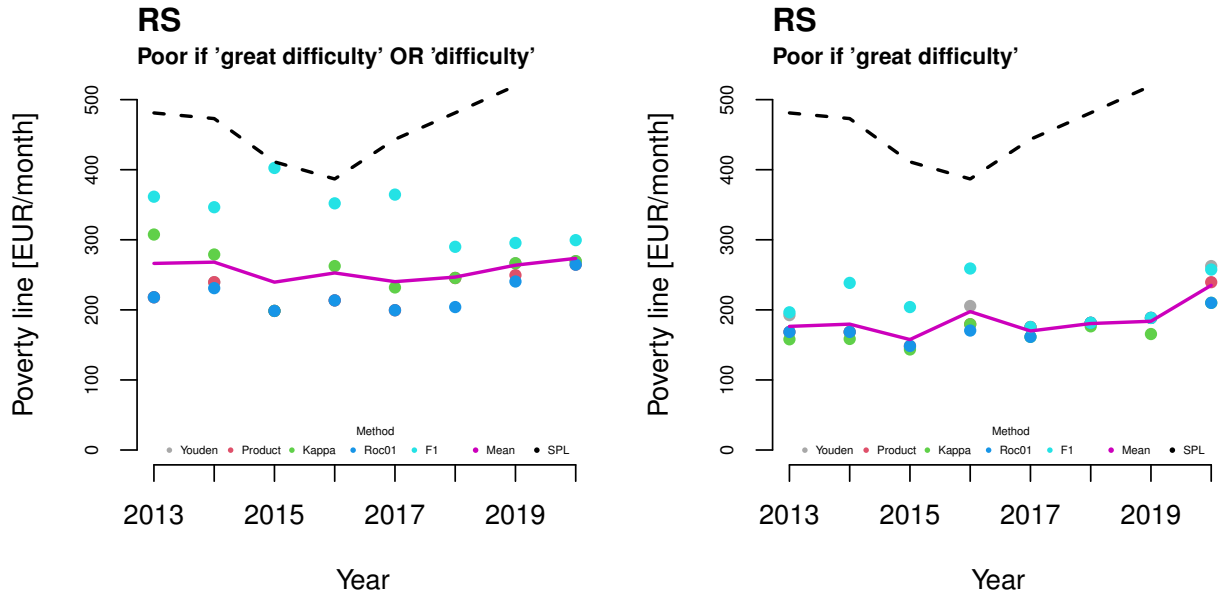

Figure S.49: Estimated cutpoints from multiple binary classification methods *(Serbia)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

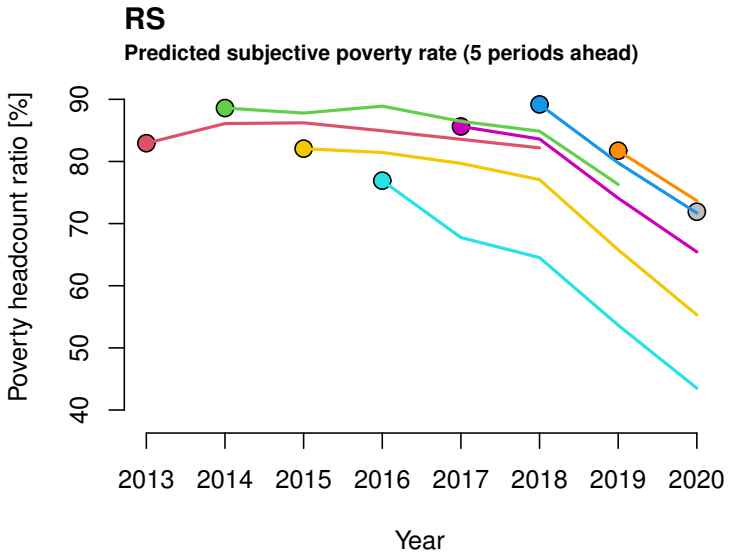

Figure S.50: Predicted subjective poverty rate: neural network model analysis *(Serbia)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

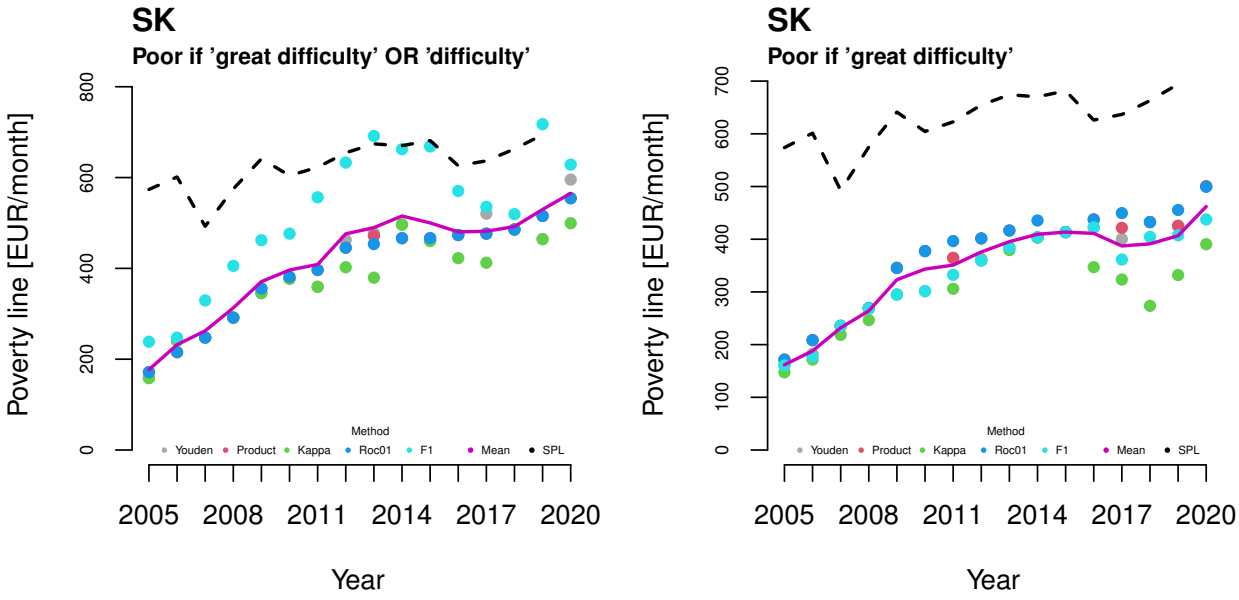

Figure S.51: Estimated cutpoints from multiple binary classification methods *(Slovakia)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

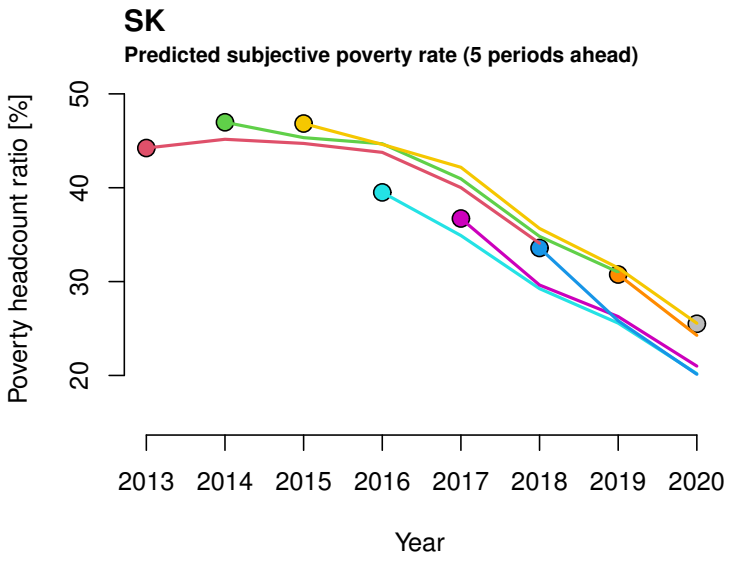

Figure S.52: Predicted subjective poverty rate: neural network model analysis *(Slovakia)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

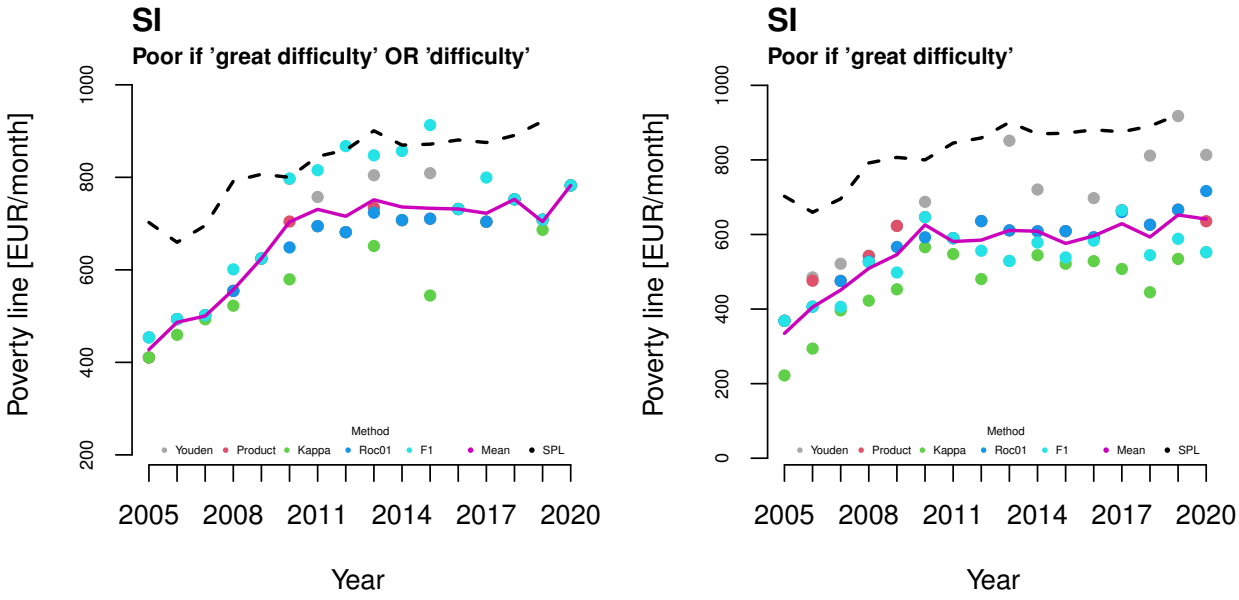

Figure S.53: Estimated cutpoints from multiple binary classification methods *(Slovenia)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

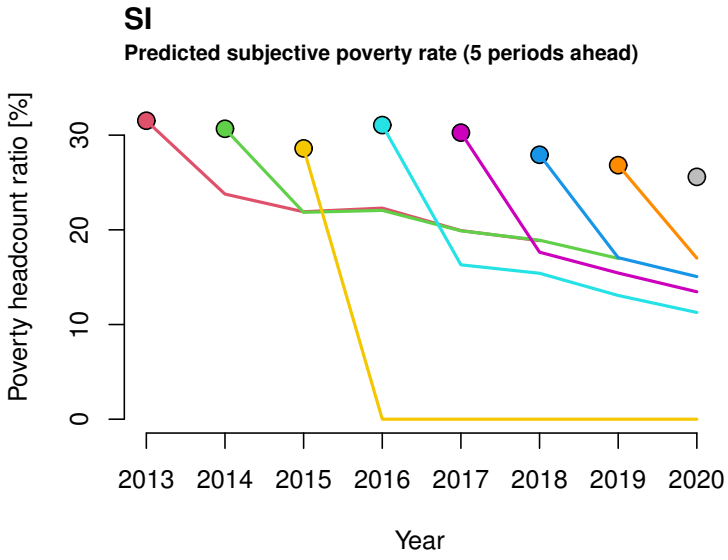

Figure S.54: Predicted subjective poverty rate: neural network model analysis *(Slovenia)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

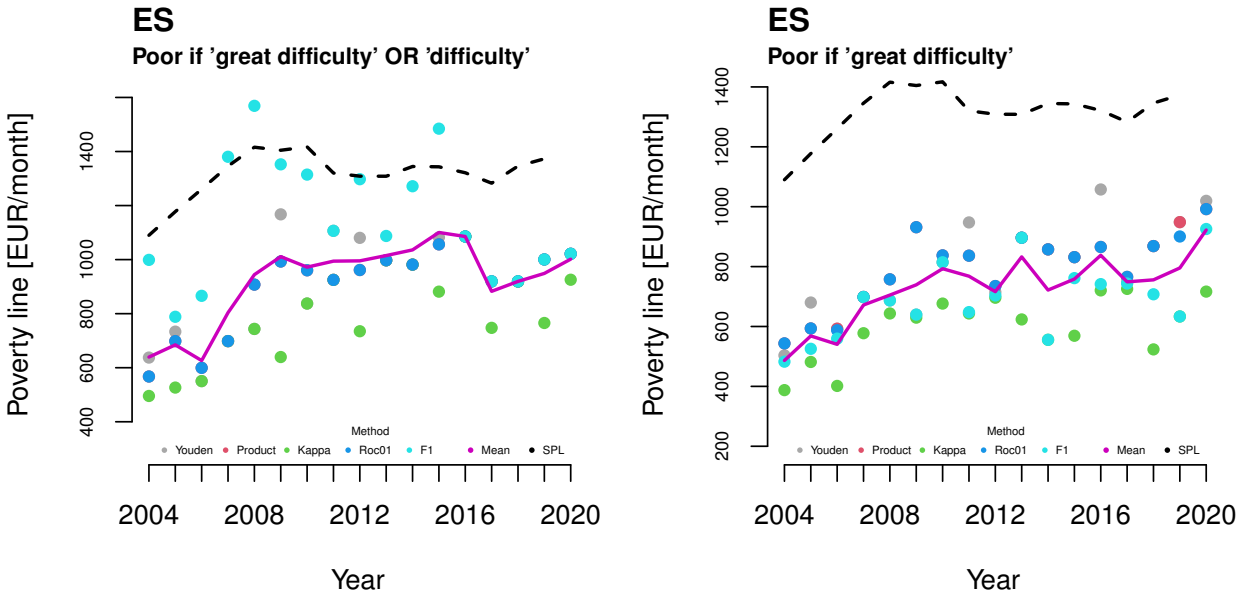

Figure S.55: Estimated cutpoints from multiple binary classification methods *(Spain)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

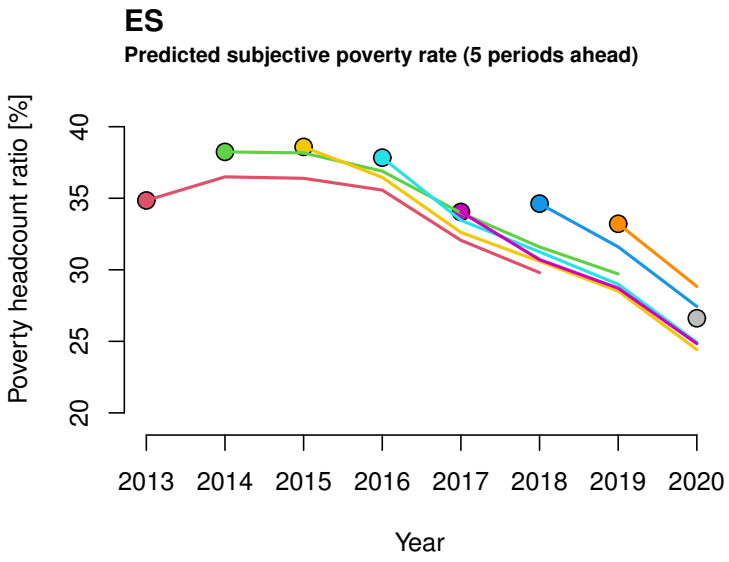

Figure S.56: Predicted subjective poverty rate: neural network model analysis *(Spain)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

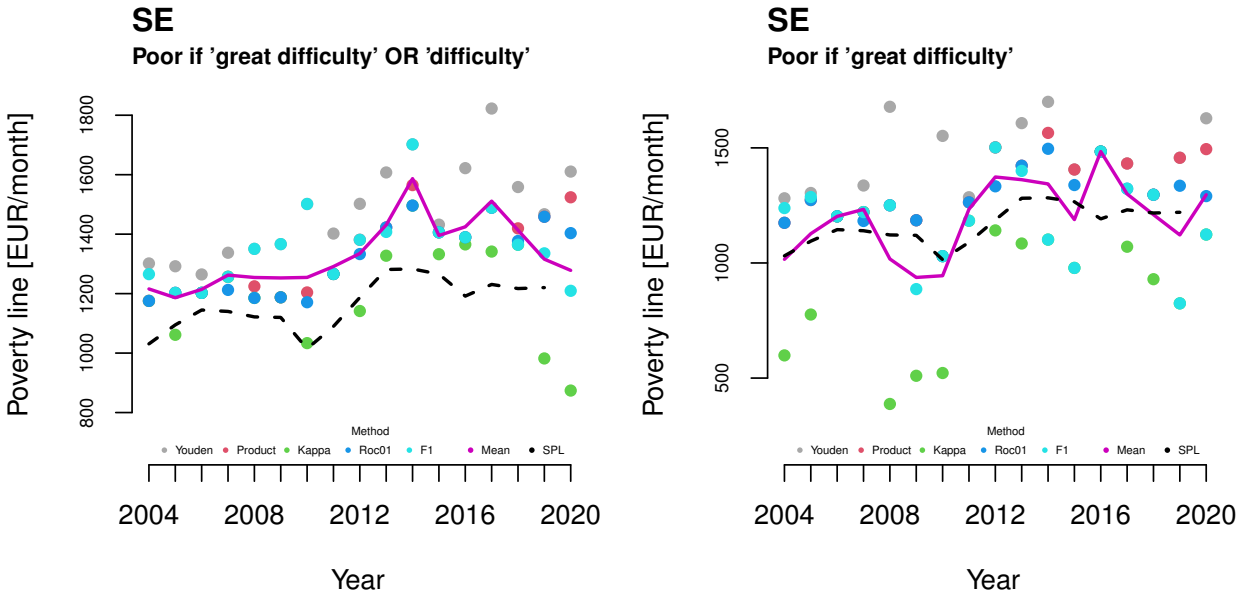

Figure S.57: Estimated cutpoints from multiple binary classification methods *(Sweden)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

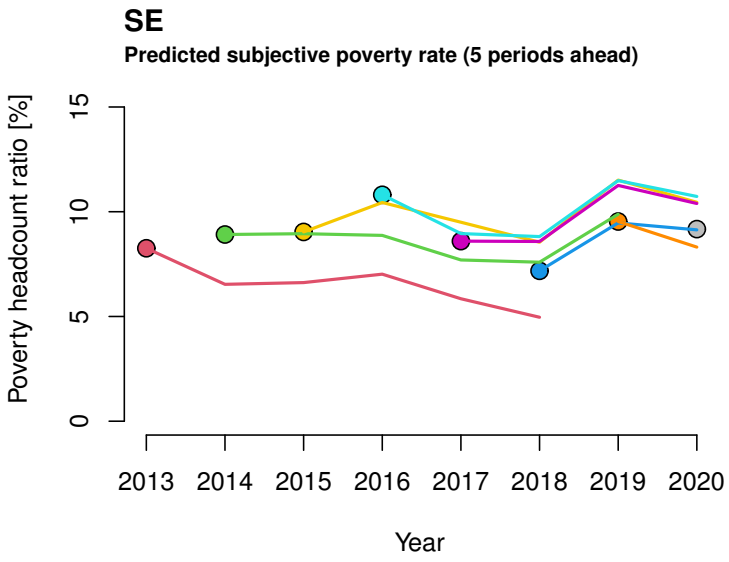

Figure S.58: Predicted subjective poverty rate: neural network model analysis *(Sweden)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

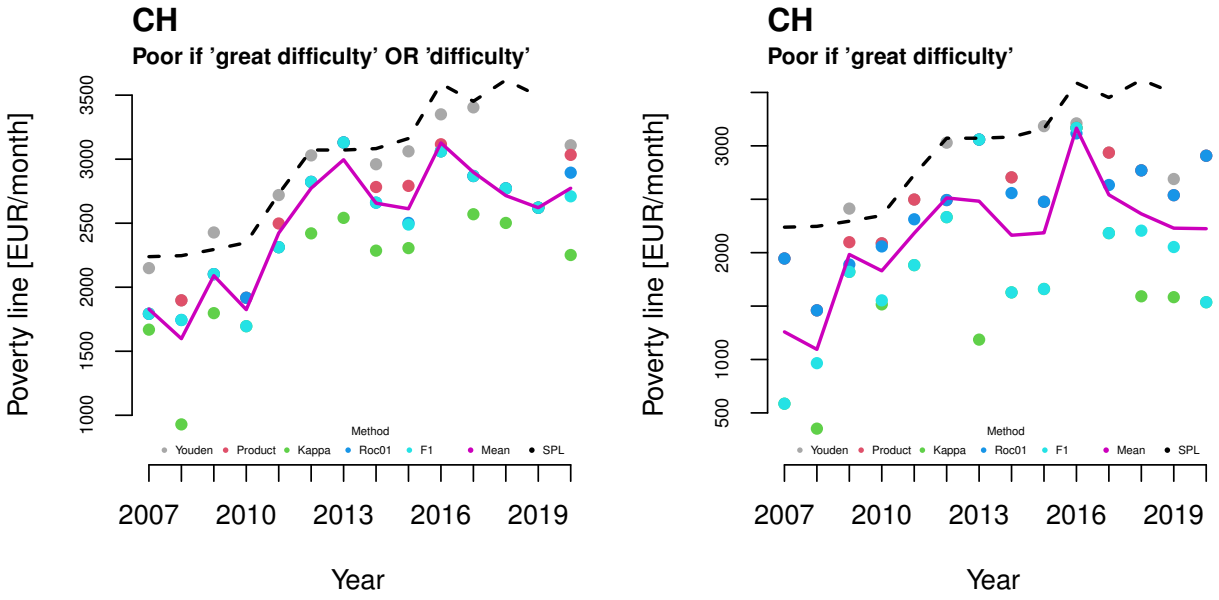

Figure S.59: Estimated cutpoints from multiple binary classification methods *(Switzerland)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

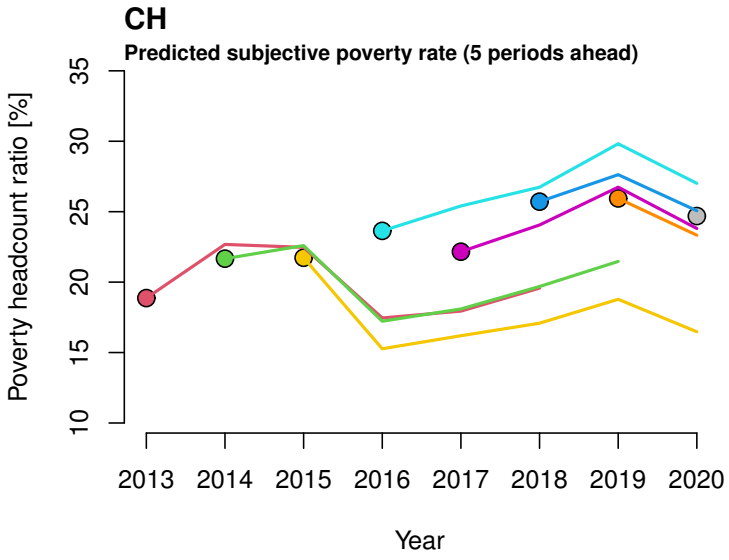

Figure S.60: Predicted subjective poverty rate: neural network model analysis *(Switzerland)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

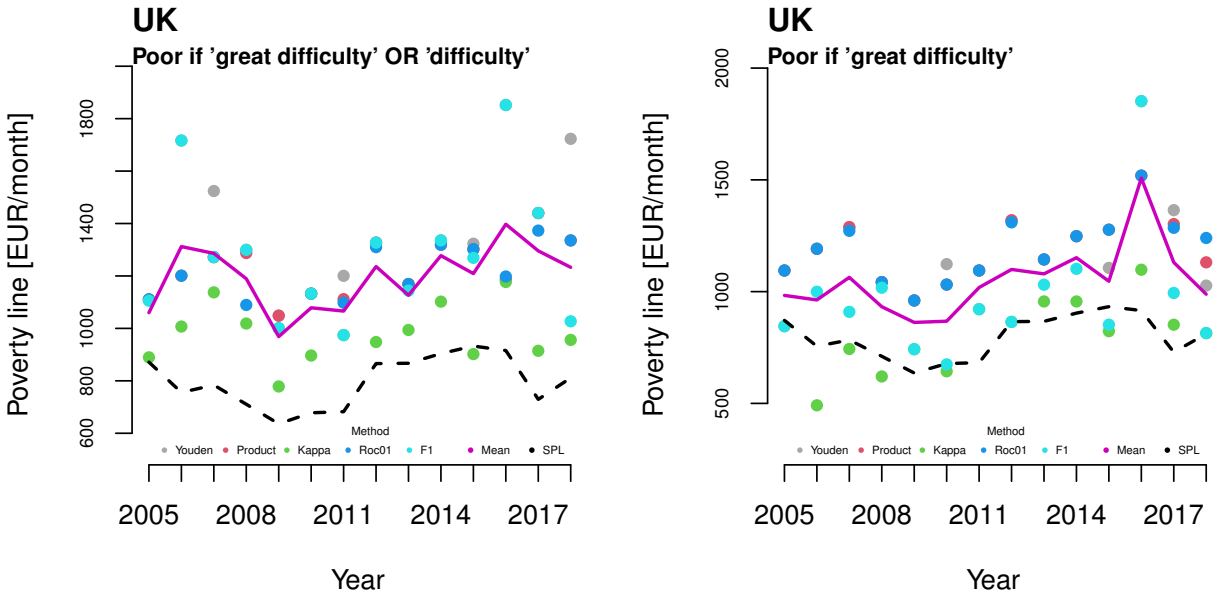

Figure S.61: Estimated cutpoints from multiple binary classification methods *(United Kingdom)*

Notes: In the left panel, a household is classified as poor if the household is able to make ends meet with great difficulty or difficulty. In the right panel, a household is classified as poor if the household is able to make ends meet with great difficulty. 'SPL' denotes a subjective poverty line based on the intersection approach with MIQ. 'Mean' represents the arithmetic mean of cutpoints derived from the metrics: Youden Index (Youden), the Product of Sensitivity and Specificity (Product), the F1 Score (F1), Cohen's Kappa (Kappa), and Distance to the point [0,1] on the ROC space (Roc01).
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.

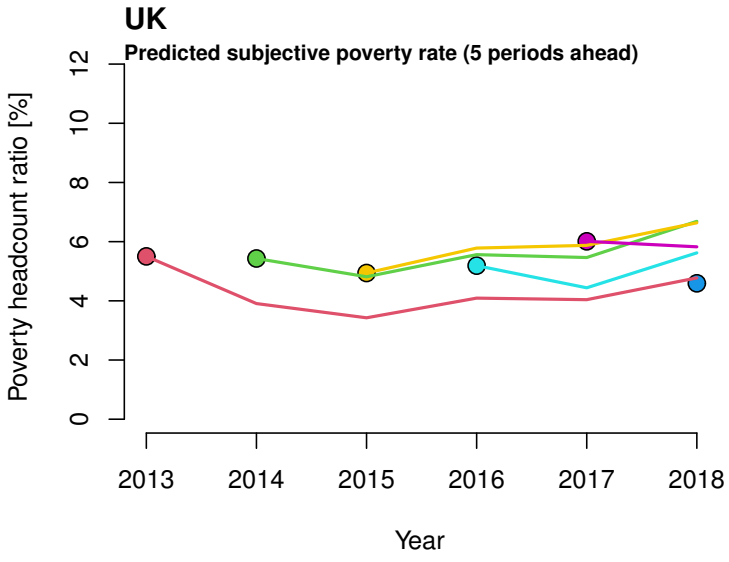

Figure S.62: Predicted subjective poverty rate: neural network model analysis *(United Kingdom)*

Notes: The figure illustrates the predicted subjective poverty rates, with each color representing predictions (up to 5 periods ahead) from a model trained on the respective year's dataset.
Source: 2004 - 2020 EU-SILC Cross UDB – version of 2023-09.