



Edinburgh Conference 2025

Enhancing Credit Accessibility through TransUnion's Income Model

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Introduction

As part of Affordability journeys lenders will often be required to validate customer declared income

To improve the customer journey and reduce costs by asking for paper-based proofs, lenders will often incorporate automated checks with Credit Reference Agencies (CRAs) to validate using Current Account TurnOver (CATO) data

In some scenarios sufficient CATO or income data may not always be available, so the modelled income can supplement the data

TransUnion have developed an income estimator model to supplement CATO data to increase the size of the population that can be passed through automated checks

A Modelled Income has been developed to compliment the **Income Verification** and **Payment Verification** components of TransUnion's Affordability Report solution

Affordability & Indebtedness Risk

Predictive debt to income ratios, variables and Over-Indebtedness score that indicate financial distress above traditional credit risk.

Income Verification

Automated income validations that provide confidence before affordability assessments are made

Payment Verification

Configurable and transparent affordability calculation to test up to 20 payment amounts



Income Shock

A range of variables showing recent & over time, reductions and recovery of consumers income

Trended Affordability

new set of attributes and algorithms that will provide additional insights based on a consumers affordability position over the last 12 months to help improve decisioning

Enhanced Income Verification using Open Banking

Transaction level   consumers income using Bud's Open Banking Assess to maximise automated income verifications



Delivering clarity and confidence, supporting responsible lending practices that protect consumers and lenders

What is It ?

Modelled value that can be used alongside existing data sources as an additional step in a waterfall affordability strategy

Our modelled Income is built using credit attributes to estimate a consumers income value

It is a customer level model using credit report data

The model is trained on application salary data provided by the main UK lenders

XGBoost model with outcome weighting applied to increase the contribution of underrepresented lower-income individuals



Supports frictionless onboarding and account management challenges around income verification where limited / or no income information is available

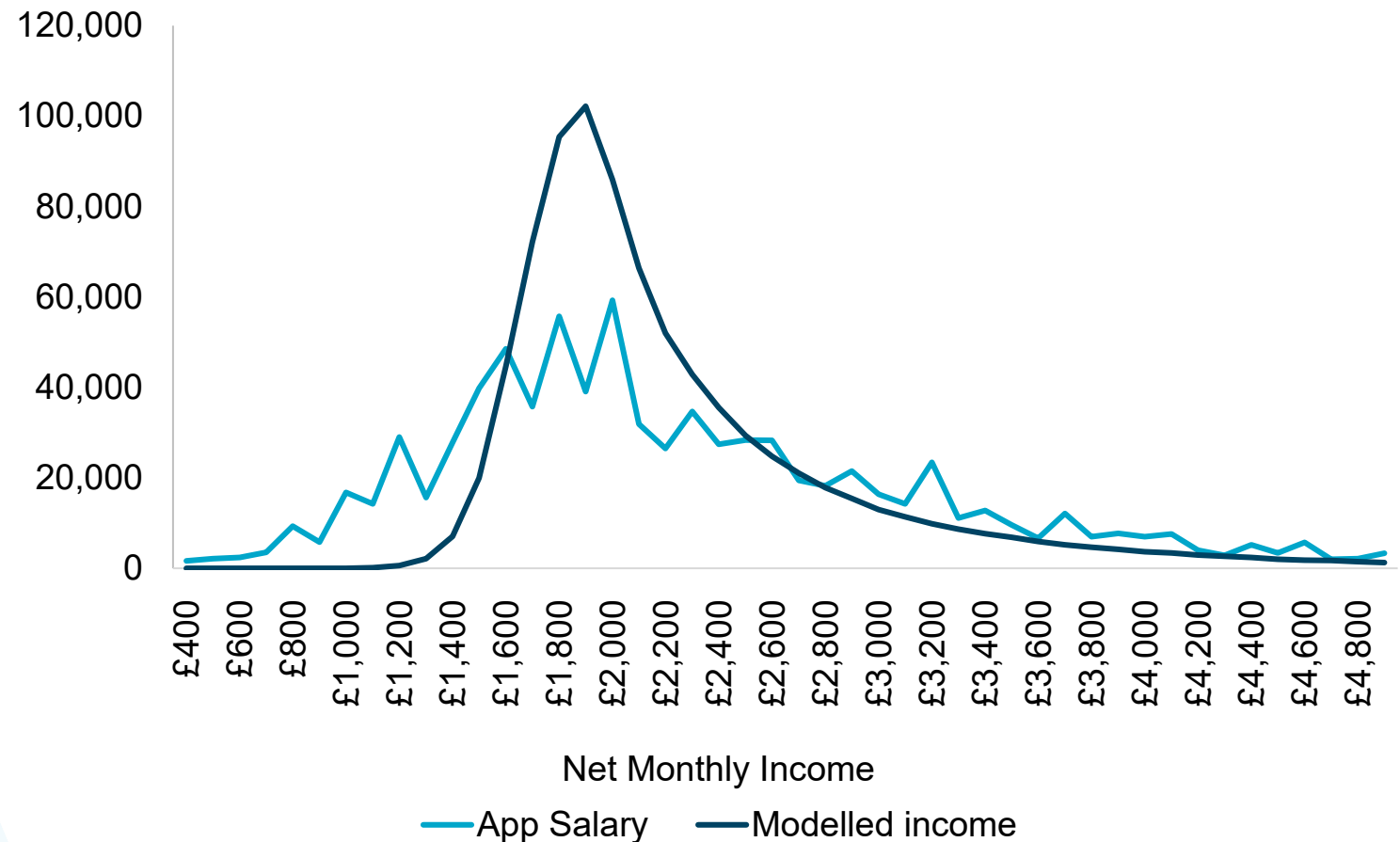
Underpinned by credit report data

Most predictive attributes*:

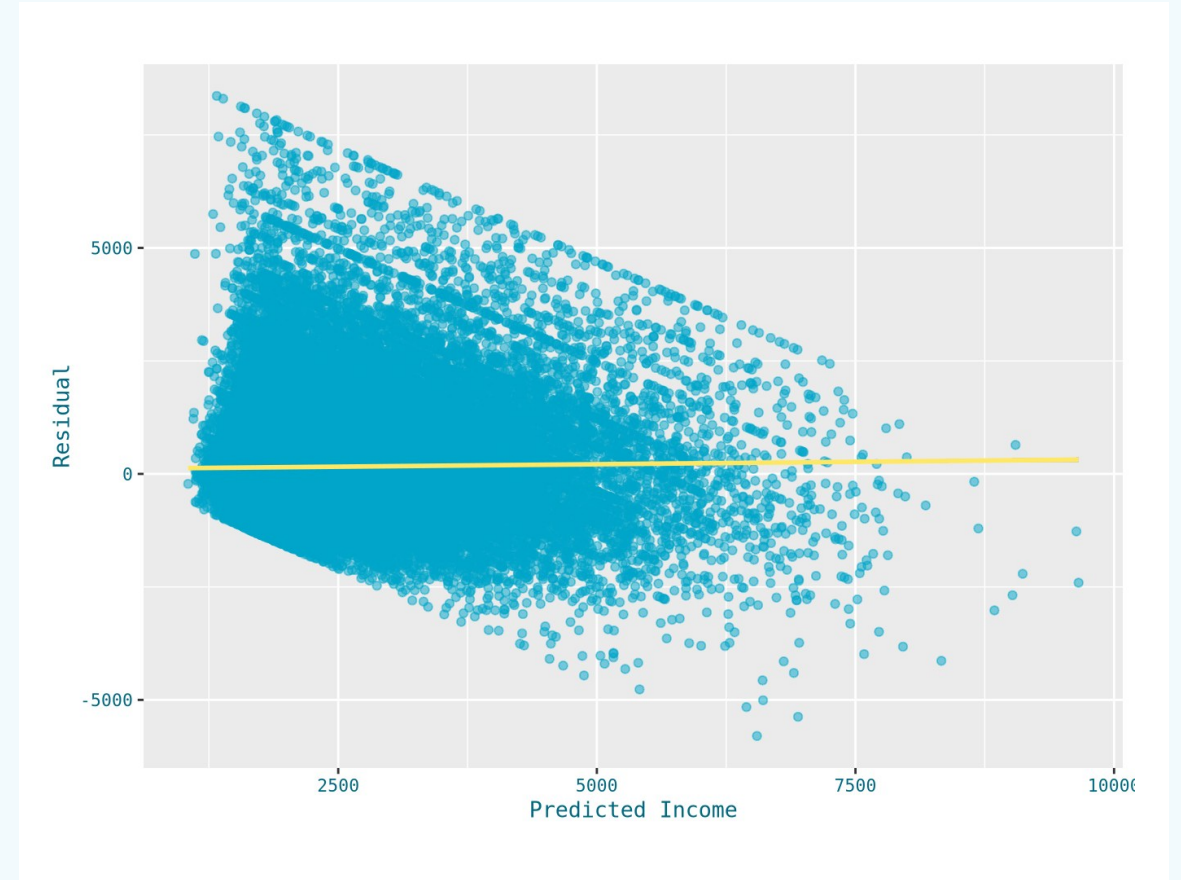
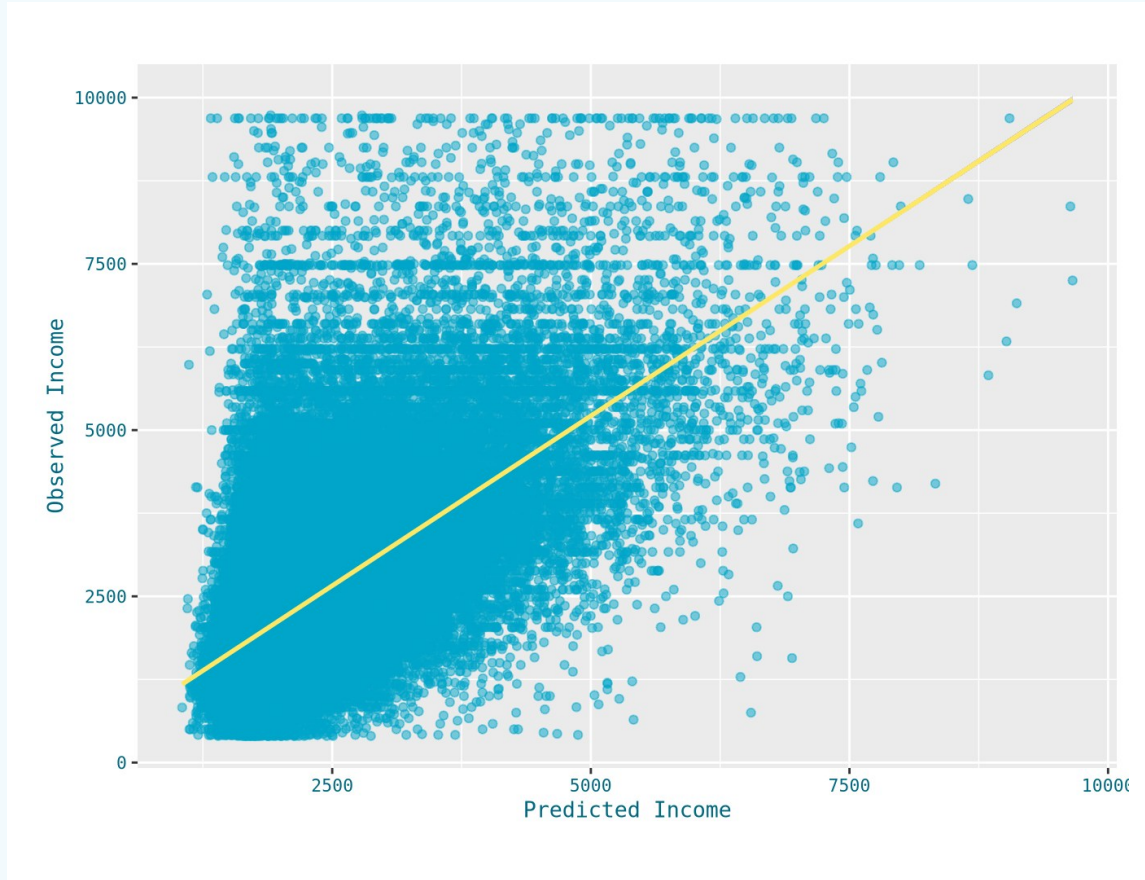
- **Exposure** – Debt, limits, payment on credit accounts
- **Product holdings** – Number and type of accounts
- **Tenure** – Number of addresses held, months since oldest account

* Attributes - model is still a prototype subject to change as part of a full build

Known Income v Modelled Income Distributions



Model Validation–Diagnostic Plots



Model validation results show that the model rank orders income successfully

- When comparing estimated vs actual results at a granular £ level the *accuracy may not be acceptable for every client*
- **Particularly evident at the extreme ends of the distribution**, e.g. 4.6% of the population have Application Salary \geq £5k but the model only predicts 1.1% at this level
- Expect most clients to use the income model to validate whether someone has an income \geq a particular threshold so an alternative approach, using the same model, has been proposed

[illegible]

% total within bandings	
Same	12.9%
+/- 1 Band	35.7%
+/- 2 Bands	54.7%

Model Validation Results

Alternative approach

- Uses the *modelled vs actual application salary validation results* to return a likelihood that an individual's income is higher than a given threshold (see next slide):
 - Recalculate the validation results table but rather than returning % total, instead return 100% - cumulative column % (to give % of population above each value)
 - Calculate the modelled income for an individual as before and locate the column related to this value
 - The %s within that column show the likelihood of the actual income being above the values within each row

Cumulative Column		Modelled Income (rounded to nearest £200)																				
% Above		£1,000	£1200	£1400	£1600	£1800	£2000	£2200	£2400	£2600	£2800	£3000	£3200	£3400	£3600	£3800	£4000	£4200	£4400	£4600	£4800	£5000+
Application Salary	<=£200	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	£400	100.0%	99.9%	99.9%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	£600	95.2%	96.7%	97.7%	98.8%	99.4%	99.7%	99.8%	99.8%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
	£800	83.6%	91.6%	94.4%	96.9%	98.5%	99.3%	99.5%	99.7%	99.7%	99.8%	99.8%	99.8%	99.8%	99.8%	99.9%	99.9%	99.8%	99.8%	99.8%	99.8%	99.9%
	£1000	68.5%	80.6%	88.1%	93.4%	96.6%	98.2%	98.9%	99.2%	99.3%	99.5%	99.6%	99.7%	99.7%	99.7%	99.7%	99.9%	99.8%	99.6%	99.6%	99.8%	99.8%
	£1200	45.2%	57.9%	73.9%	84.1%	90.9%	94.7%	96.7%	97.7%	98.3%	98.7%	98.9%	99.1%	99.3%	99.3%	99.5%	99.5%	99.6%	99.4%	99.4%	99.5%	99.6%
	£1400	32.5%	43.9%	61.3%	73.5%	83.5%	90.2%	93.9%	95.9%	97.1%	97.8%	98.3%	98.6%	98.8%	98.9%	99.3%	99.2%	99.4%	99.4%	99.3%	99.5%	99.4%
	£1600	22.9%	29.0%	44.0%	56.8%	70.1%	80.4%	87.9%	92.0%	94.3%	96.0%	96.9%	97.8%	98.1%	98.3%	98.6%	98.8%	99.1%	99.0%	98.9%	99.3%	99.3%
	£1800	16.1%	20.0%	31.3%	42.7%	56.0%	68.2%	78.9%	85.8%	90.3%	93.1%	94.9%	96.3%	96.9%	97.3%	97.8%	98.1%	98.7%	98.7%	98.6%	99.0%	99.2%
	£2000	11.3%	13.7%	21.2%	29.5%	41.0%	53.6%	66.9%	76.8%	83.8%	88.8%	91.7%	94.1%	95.3%	96.2%	96.6%	97.5%	98.1%	98.3%	98.3%	98.7%	98.9%
	£2200	6.5%	9.9%	15.4%	22.2%	31.8%	42.7%	55.5%	66.9%	75.8%	83.0%	87.4%	90.7%	92.8%	94.2%	95.0%	96.2%	97.2%	97.6%	97.7%	98.2%	98.7%
	£2400	4.5%	6.9%	11.1%	16.2%	23.5%	32.4%	44.0%	55.5%	66.2%	75.1%	81.1%	85.9%	88.9%	91.3%	92.8%	94.3%	96.0%	96.4%	96.8%	97.0%	98.3%
	£2600	4.1%	5.4%	8.4%	12.2%	17.9%	25.4%	35.8%	47.2%	58.0%	67.9%	75.1%	81.3%	85.1%	88.5%	90.8%	92.6%	94.9%	95.2%	96.0%	96.3%	97.9%
	£2800	3.1%	4.0%	6.3%	9.2%	13.6%	19.1%	27.2%	37.0%	47.1%	57.1%	65.4%	73.1%	78.3%	82.5%	86.4%	89.1%	92.0%	93.3%	93.8%	94.5%	97.1%
	£3000	2.7%	3.2%	4.6%	6.6%	9.7%	13.8%	20.3%	28.2%	37.6%	47.0%	55.9%	63.7%	70.3%	75.6%	80.5%	84.7%	88.7%	90.2%	91.1%	93.2%	95.9%
	£3200	2.7%	2.3%	3.6%	5.1%	7.5%	10.4%	15.3%	21.5%	29.2%	38.3%	45.8%	54.3%	61.5%	67.0%	73.1%	78.1%	83.1%	85.3%	87.4%	90.2%	93.8%
	£3400	2.4%	1.9%	3.0%	4.1%	6.1%	8.3%	12.2%	17.4%	24.0%	32.3%	39.2%	47.4%	55.0%	60.6%	67.5%	73.0%	78.8%	81.8%	84.7%	87.3%	92.7%
	£3600	2.4%	1.5%	2.4%	3.2%	4.7%	6.4%	9.4%	13.7%	19.1%	26.1%	32.7%	39.8%	47.5%	53.3%	60.2%	66.8%	72.6%	76.9%	80.4%	83.9%	90.7%
	£3800	2.4%	1.2%	1.9%	2.6%	3.7%	4.9%	7.2%	10.4%	14.7%	20.4%	26.2%	32.6%	40.0%	45.5%	52.2%	59.3%	65.4%	70.4%	74.8%	79.4%	87.9%
	£4000	2.4%	1.1%	1.6%	2.2%	3.1%	4.1%	6.0%	8.6%	12.1%	16.8%	22.2%	27.8%	34.7%	40.1%	46.1%	53.5%	59.5%	65.4%	69.0%	74.2%	85.6%
	£4200	1.4%	0.8%	1.3%	1.7%	2.3%	3.0%	4.5%	6.6%	9.5%	13.2%	18.1%	22.9%	28.9%	33.8%	40.1%	47.2%	53.3%	58.6%	63.6%	68.7%	81.2%
	£4400	1.0%	0.7%	1.1%	1.4%	1.9%	2.5%	3.6%	5.3%	7.8%	10.8%	15.0%	19.1%	23.9%	29.0%	34.6%	41.0%	47.9%	52.6%	58.1%	63.0%	77.2%
	£4600	0.7%	0.6%	1.0%	1.3%	1.7%	2.1%	3.2%	4.6%	6.8%	9.6%	13.2%	17.1%	21.4%	26.4%	31.5%	37.8%	43.9%	48.8%	54.8%	59.6%	74.8%
	£4800	0.7%	0.5%	0.8%	1.0%	1.4%	1.7%	2.6%	3.7%	5.5%	7.7%	10.6%	14.1%	17.8%	22.1%	26.8%	32.5%	38.0%	42.6%	48.9%	54.2%	70.1%
	£5000+	0.3%	0.5%	0.7%	0.9%	1.2%	1.5%	2.2%	3.1%	4.7%	6.6%	9.1%	12.0%	15.3%	19.4%	23.3%	28.8%	34.0%	39.0%	44.1%	49.6%	65.9%

- As an example, if an individual's modelled income is £2,600 then we would calculate the following:
 - Likelihood of income being >= £1000 is 99.3%
 - Likelihood of income being >= £2000 is 83.8%
 - Likelihood of income being >= £3000 is 37.6%
 - Likelihood of income being >= £4000 is 12.1%

Enhance knowledge of consumer affordability with a modelled income view to streamline customer acquisition and account management strategies

What we're hearing in the market ...



Proportional Affordability Assessment

Low risk or small ticket loan size

Relevant to markets for low risk/low credit or who rely on proportionality

Missing CATO

Not able to match all the customers using CATO and App Salary data

Corroborate other data

Use modelled income to corroborate data, e.g. old application incomes and increase confidence

Payment verification

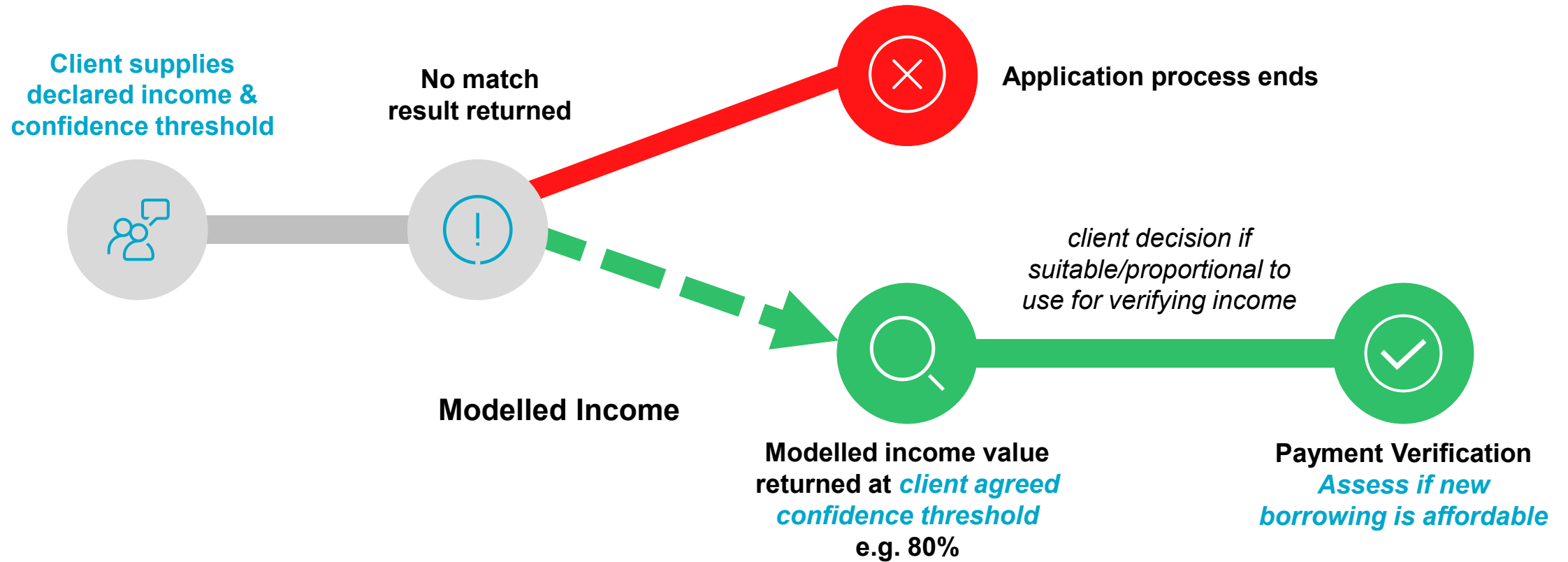
Disposable income assessment using a modelled income value

Not permitted for the following:

- Marketing purposes to target individuals
- In connection with any commercial lending, collection or debt sale activity

Client supplies declared income, no match result against CATO

Modelled income shows individuals income is X% likely to be above declared



1

AO: Income/Payment Verification

Client supplies declared income and income confidence threshold, no match result against CATO

						Additional 'Modelled Income Block'				
Cust ID	Declared Income	Confidence Threshold	Income Verification RAG (BVI3Sole)	Payment Verification RAG0 (BVI3Sole)	Client Decision	Confidence of Declared Income	Modelled Income at Confidence Threshold	Income Verification RAG (Modelled)	Payment Verification RAG0 (Modelled)	Client Decision
1001	£2600	80%	NO CATO	NO CATO	⊗	40%	£1800	Red	Amber	⊗
1002	£2000	80%	NO CATO	NO CATO	⊗	90%	£2200	Green	Green	✓

Client provides declared income in AR request and/or modelled income confidence threshold.

Likelihood income is greater than declared value

AIV RAG using modelled income with 80% confidence threshold

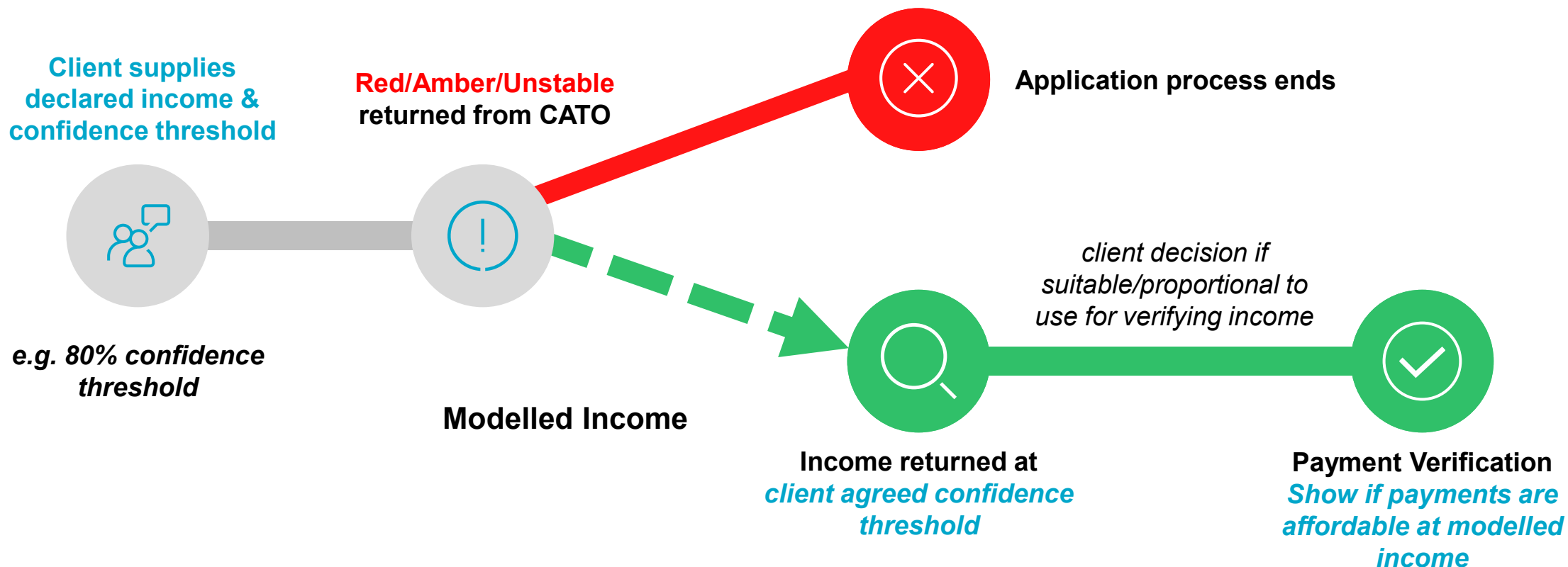
Disposable income assessment using modelled income with 80% confidence threshold

For these examples we are assuming the following underlying values

Cust ID	BVI3 Sole	BVI3 Sole Stability	Monthly Expenditure
1001	£-	No CATO	£1,700
1002	£-	No CATO	£1,400

Client supplies declared income and income confidence threshold, Red/Amber/Unstable income verification result against CATO

Modelled income returns an individual's income at the client's required confidence threshold



Client supplies declared income and income confidence threshold, Red/Amber/Unstable income verification result against CATO

						Additional 'Modelled Income Block'					
Cust ID	Declared Income	Confidence Threshold	Income Verification RAG (BVI3Sole)	Payment Verification RAG0 (BVI3Sole)	Client Decision	Confidence of Declared Income	Modelled Income at Confidence Threshold	Income Verification RAG (Modelled)	Payment Verification RAG0 (Modelled)	Client Decision	
1001	£2800	80%	Red	Red	⊗	50%	£2200	Red	Red	⊗	IV Fail, PV Fail with Modelled Income
1002	£2000	80%	Amber	Red	?	90%	£2200	Green	Amber	?	IV Pass, PV Marginal with Modelled Income
1003	£3000	80%	Green (unstable)	Green (unstable)	?	85%	£3200	Green	Green	✓	IV Pass, PV Pass with Modelled Income
1004	£1600	80%	Amber	Amber	?	80%	£1600	Amber	Amber	?	IV Marginal, PV Marginal with Modelled Income

Client provides declared income in AR request and/or modelled income confidence threshold.

Current Affordability Report output

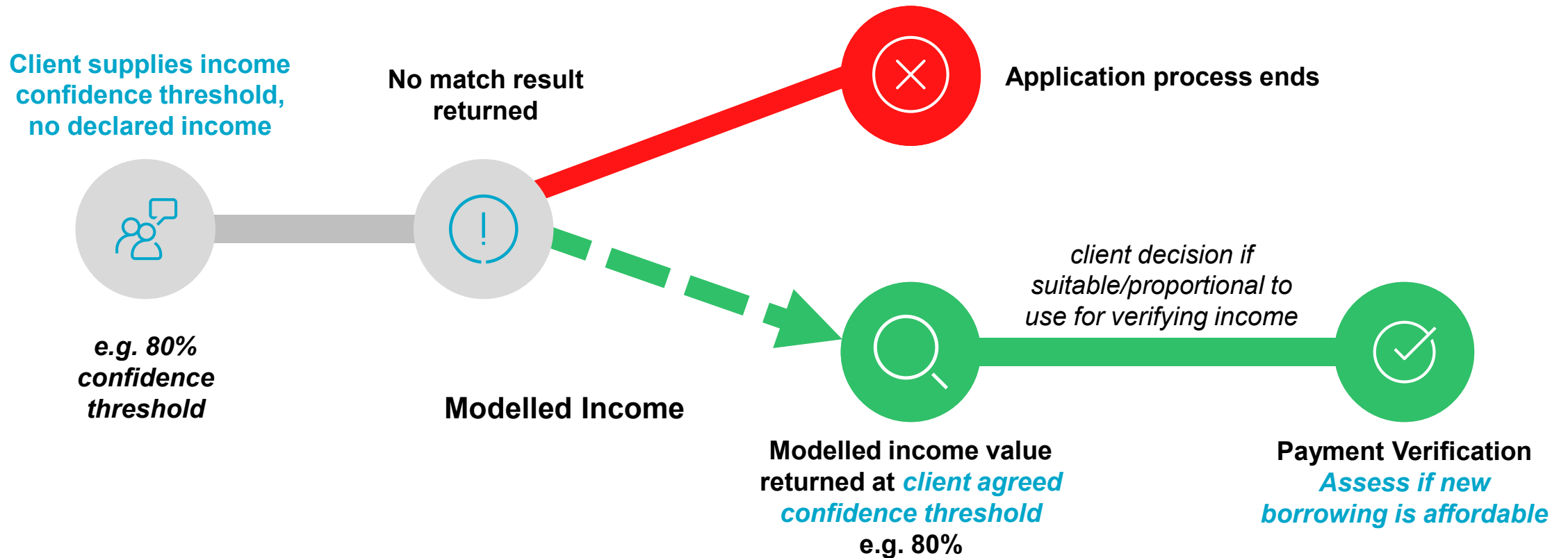
Likelihood income is greater than declared value

AIV RAG using modelled income with 80% confidence threshold

Disposable income assessment using modelled income with 80% confidence threshold

Declared income not available, modelled income confidence threshold provided

Modelled income returns an individual's income at the client required confidence



Declared income not available, modelled income confidence threshold provided

Cust ID	Declared Income	Confidence Threshold	Income Verification RAG (BVI3Sole)	Payment Verification RAG0 (BVI3Sole)	Client Decision	Additional 'Modelled Income Block'			
						Modelled Income at Confidence Threshold	Payment Verification RAG0 (Modelled)	Client Decision	
1001	--	80%	--	Red	⊗	£2000	Amber	?	No evidence of additional affordability with BVI3, potential for additional lending using modelled income with 80% confidence.
1002	--	80%	--	Green (unstable)	?	£3200	Green	✓	Referral decision with BVI3 as unstable. Modelled income at 80% confidence supports accept decision.
1003	--	80%	--	Amber	?	£1400	Amber	?	Referral decision with BVI3. Modelled income at 80% confidence supports referral decision.
1004	--	80%	--	NO CATO	⊗	£1800	Amber	?	No CATO income available. Modelled income at 80% confidence supports referral decision.
1005	--	80%	--	NO CATO	⊗	£2200	Green	✓	No CATO income available. Modelled income at 80% confidence supports accept decision.

Client provides confidence threshold

Current Affordability Report output

Payment verification would use the modelled income directly within the RAG calculation

Proof of Value – Income Verification

Using modelled income alongside traditional Income Verification practices for Buy Now Pay Later (BNPL)

Row %		Income Verification (Income Model With 80% Confidence)			
		Green	Amber	Red	Total
Income Verification (CATO Data)	Green	17.7%	9.8%	72.5%	100.0%
	Amber	7.1%	7.6%	85.2%	100.0%
	Red	6.8%	5.5%	87.7%	100.0%
	No Data/Low Confidence	17.1%	9.2%	73.7%	100.0%
	Total	15.9%	9.1%	75.0%	100.0%

Bad Rate		Income Verification (Income Model With 80% Confidence)			
		Green	Amber	Red	Total
Income Verification (CATO Data)	Green	0.6%	1.3%	0.7%	0.8%
	Amber	0.0%	0.1%	0.7%	0.6%
	Red	0.8%	1.7%	0.9%	0.9%
	No Data/Low Confidence	0.4%	0.2%	0.8%	0.7%
	Total	0.5%	0.9%	0.8%	0.8%

- BNPL originations from December 2023 have been passed through an Income Verification assessment using existing Current Account TurnOver data vs a modelled income
- Demonstrates that by using modelled income, 17% of the existing 'No Data/Low Confidence' population could now pass Income Verification
- Bad rates, using a 2+ months in arrears within first 12 months on book definition, show that the newly approved individuals are generally lower risk

Proof of Value – I & E Assessment

Using modelled income alongside traditional income & expenditure assessments for Buy Now Pay Later (BNPL)

Row %		Income & Expenditure Assessment (Income Model With 80% Confidence)				
		Green	Amber	Red	No Data	Total
Income & Expenditure Assessment (CATO Data)	Green	50.9%	14.2%	34.9%	0.0%	100.0%
	Amber	12.9%	11.8%	75.2%	0.0%	100.0%
	Red	10.8%	7.2%	81.9%	0.0%	100.0%
	No Data/Low Confidence	48.7%	12.7%	38.4%	0.2%	100.0%
	Total	46.6%	13.2%	40.1%	0.1%	100.0%

Bad Rate		Income & Expenditure Assessment (Income Model With 80% Confidence)				
		Green	Amber	Red	No Data	Total
Income & Expenditure Assessment (CATO Data)	Green	0.7%	0.7%	0.8%	0.0%	0.7%
	Amber	0.5%	1.1%	1.4%	0.0%	1.3%
	Red	0.3%	1.0%	1.3%	0.0%	1.2%
	No Data/Low Confidence	0.5%	0.9%	0.9%	0.8%	0.7%
	Total	0.6%	0.8%	0.9%	0.6%	0.8%

- BNPL originations from December 2023 have been passed through an Income & Expenditure assessment using existing Current Account TurnOver data vs a modelled income
- Demonstrates that by using modelled income, 49% of the existing 'No Data/Low Confidence' population could now pass an Income & Expenditure assessment
- Bad rates, using a 2+ months in arrears within first 12 months on book definition, show that the newly approved individuals are generally lower risk

Q&A

Contact:



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Thank You

