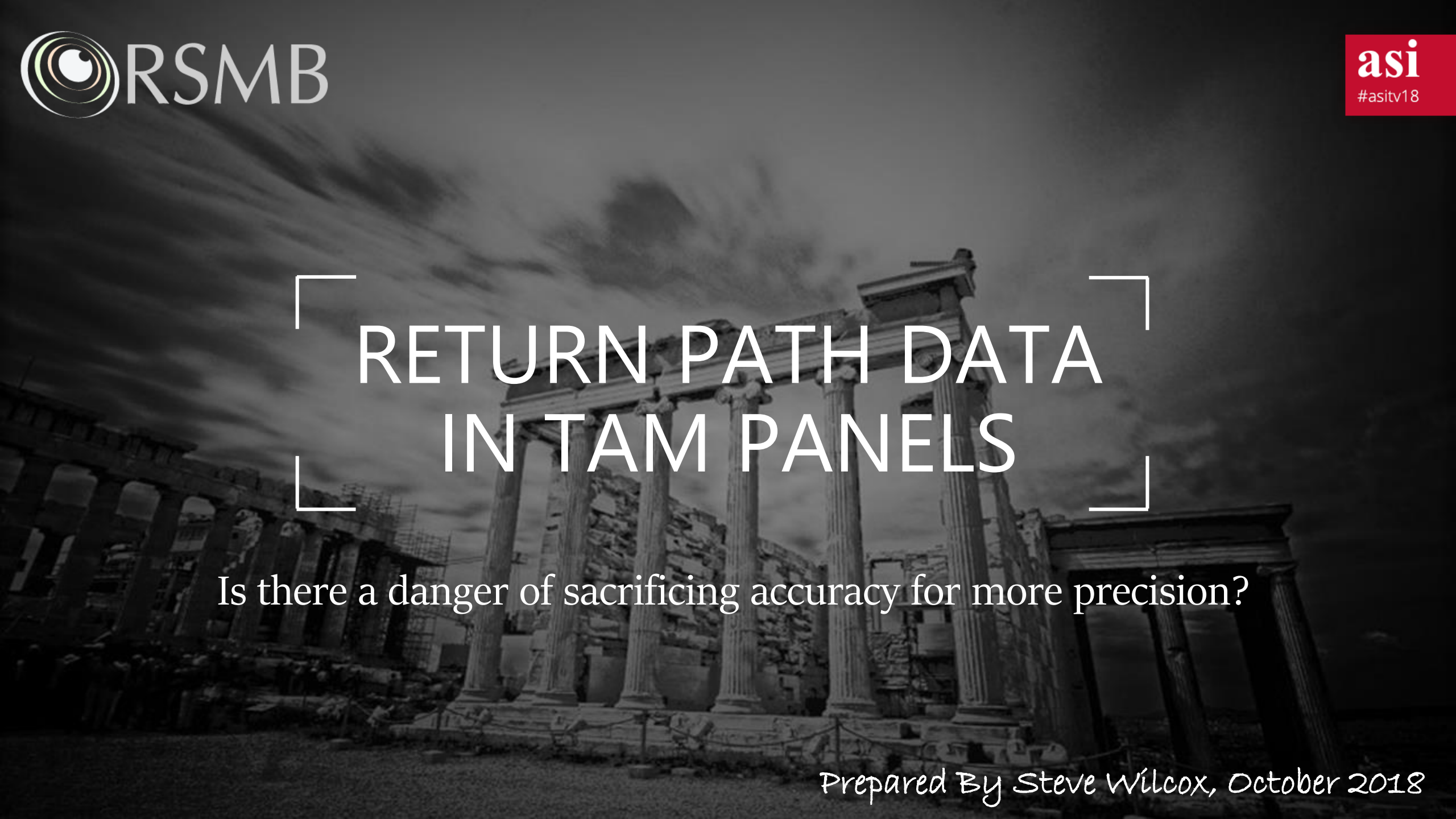

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RETURN PATH DATA IN TAM PANELS

Is there a danger of sacrificing accuracy for more precision?

Prepared By Steve Wilcox, October 2018

PEOPLEMETER PANELS

Can measure all viewing events plus:

- people and demographic profiles
- reach and frequency across all channels and platforms

Cost constraints = large sampling error:

- long tail of small TV events
- large number of zero ratings

SET TOP BOX RETURN PATH DATA HYBRID

Single source measurement of all “viewing” activity on a particular platform:

- cost effective
- large sample with demographics of household members
- census without demographics of household members

Model to predict which household members are actually viewing

- informed by TAM panel
- can be used to boost the TAM panel sample

POPULAR CONCEPTIONS

"If the RPD sample is large enough, surely it can only improve the audience measurement, even if we don't know the demographics of the people living in each RPD home?"

"Okay, I know a hybrid boost for a single platform won't help the other platforms, but surely it can't damage the combined audience sampling error?"

RPD HYBRID

POSITIVES

More precision

- eliminate “accidental” zero ratings
- provide a realistic measurement of the long tail of small programmes and channels
- provide a more stable measurement of the larger programmes and channels
- audiences are more predictable

RPD HYBRID

NEGATIVES

Less accuracy

- potential bias in modelled components
- regression-to-the-mean reduces sensitivity from programme to programme
- regression-to-the-mean inflates reach

THE TRADE-OFF

THE TRADE-OFF

Do the positives outweigh the negatives?

- do our best to quantify model effects
- check that positives really do deliver
- watch out for counter-intuitive results

Zero ratings may trump all other considerations

IS THE TRADE-OFF THE SAME FOR SMALL VS. LARGE AUDIENCES?

- Maybe a small channel doesn't need demographic profiles?
  - at all
  - for programmes/commercials
- Maybe we're more happy to accept regression-to-the-mean or bias in small channel audiences?
- Can we protect the accuracy of large audience estimates while creating usable data for the small audiences?

THE MIXED ECOLOGY (BARB UK)

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Sample Size	Number of Programmes	Share of Viewing	Qualifying Channels
100+	1%	46%	19
50 to 100	3%	14%	24
10 to 50	10%	17%	115
Less	86%	13%	175

- We need to do something about the long tail and doubling the panel won't help.
- It would be nice to increase precision for the larger programmes, but we must not sacrifice accuracy for such a large share of viewing


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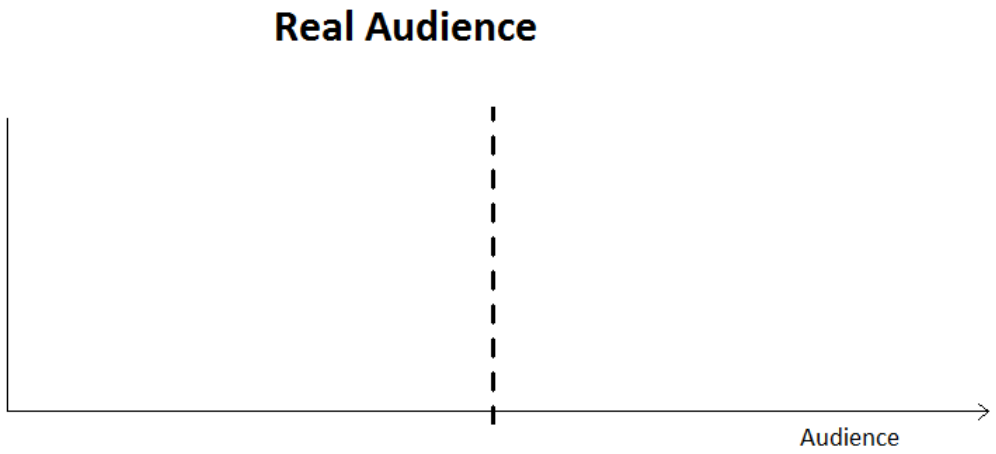
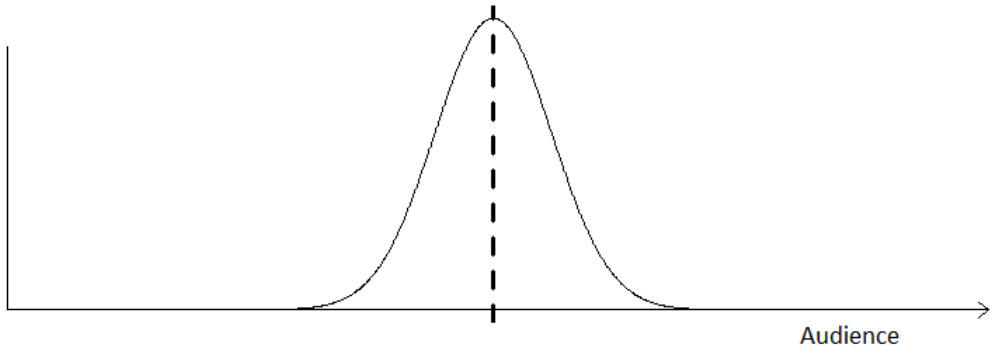
ACCURACY AND
PRECISION

ACCURACY AND PRECISION



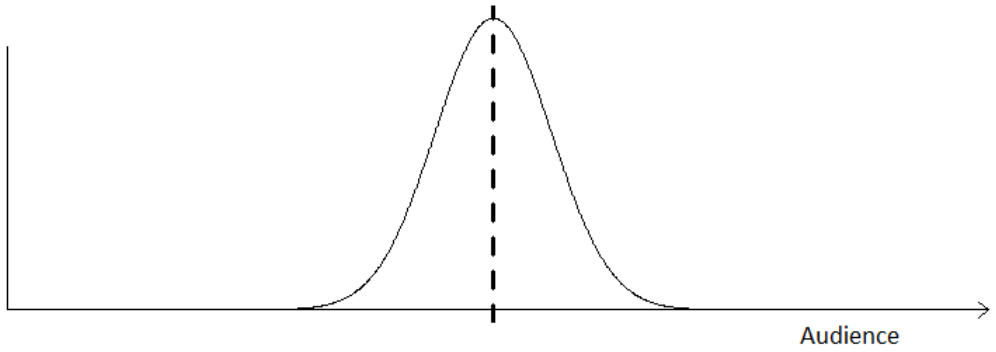
ACCURACY AND PRECISION

TAM Panel – Accurate but not Precise

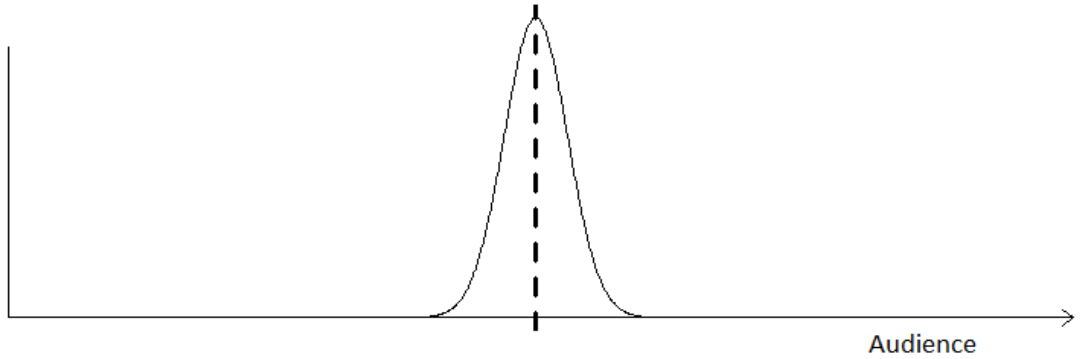


ACCURACY AND PRECISION

TAM Panel – Accurate but not Precise

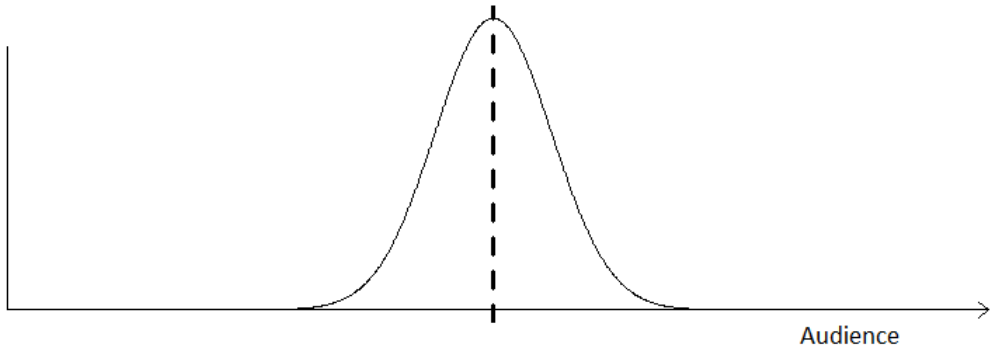


Perfect Hybrid Model – Accurate and Precise

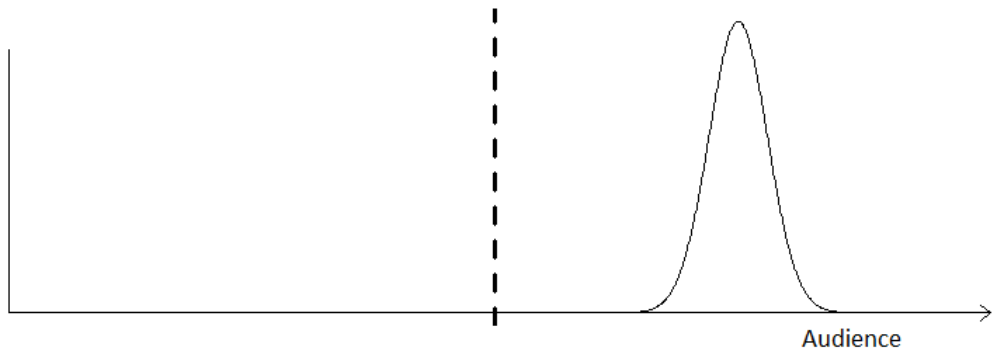


ACCURACY AND PRECISION

TAM Panel – Accurate but not Precise

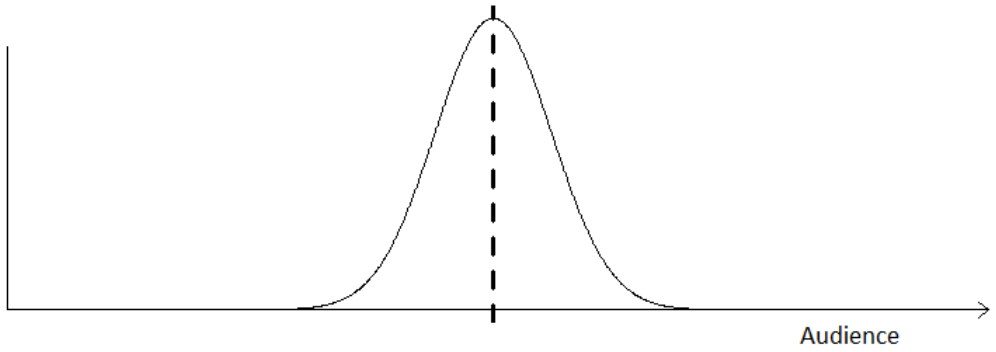


Hybrid with RTM/Bias – Precise but not Accurate

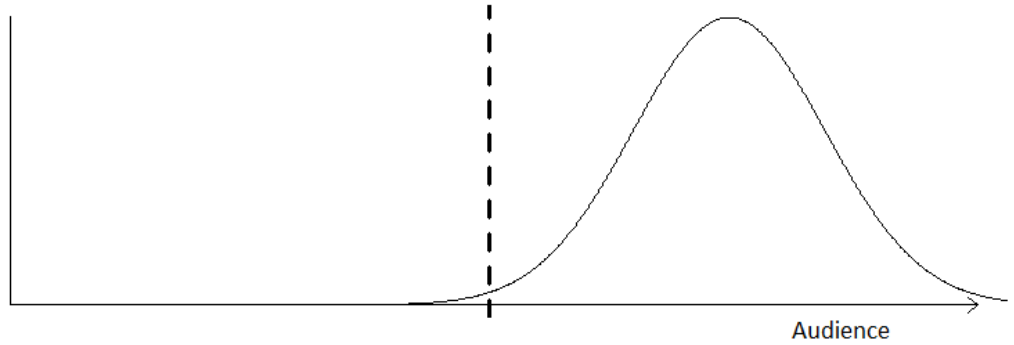


ACCURACY AND PRECISION

TAM Panel – Accurate but not Precise



The Hybrid We Don't Want! – Neither Accurate nor Precise



Does RPD really improve the sampling error of demographic audiences for larger programmes or channels?

Evaluate sampling error to understand the underlying benefits of RPD

Remember we can’t reduce sampling error for components of the hybrid measured by the TAM panel

DEMOGRAPHIC AUDIENCE COMPONENTS

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- Demographic audience in homes not covered by RPD universe
- Demographic audience for devices not covered by RPD universe
- Demographic audience in the RPD universe
    - number of homes viewing
    - number of demographic viewers per viewing home
    - which viewing homes contain the demographic
- Plus cross-platform correlations
- Plus smoothing models which project average behaviour onto specific audience measurements

THE ESSENTIAL HYBRID MODEL

H = Number of homes viewing (RPD)

P = Number of people per viewing home (TAM)

People audience = H x P

THE ESSENTIAL HYBRID MODEL

QUESTION...

If the RPD sample is large enough, surely it can only improve the audience measurement, even if we don't know the demographics of the people living in each RPD home?

...TRUE OR FALSE?

FALSE

Some results are counter-intuitive

RPD WITHOUT PERSON DEMOGRAPHICS

Components of variance

VH = Sampling variance in homes viewing
VP = Sampling variance in people per home viewing
Sampling error = $\sqrt{(VH + VP)}$

- A large RPD sample reduces VH
- Absence of person demographics increases VP
- Overall sampling error can increase

THEORETICAL ILLUSTRATION

- 100 TAM panel households are viewing
- 10 contain the demographic
- 8 of the demographic are viewing

	RPD With Demographics	RPD Without Demographics
n = Homes viewing sample	10	100
p = Viewer per view factor	0.8	0.08
s.e. = $\sqrt{P(I-P)/n}$	0.13	0.027
Coefficient of variation	16%	34%

SINGLE PLATFORM HYBRID MODEL

QUESTION...

Okay, I know a hybrid boost for a single platform won't help the other platforms, but surely it can't damage the combined audience sampling error?

...TRUE OR FALSE?

FALSE

More counter-intuitive results

For the single source TAM panel, the sum of viewing across all platforms is more robust than the separate platforms. If we:

- “correct” platform A up or down
- make no compensating correction for platform B
- platform A + platform B is destabilised


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THE BARB
EXPERIMENT

THE BARB EXPERIMENT

- Decompose the sampling error formula into components:
  - those which can be reduced by an RPD boost
  - those which may increase as a result of losing TAM panel single source attributes

- Apply alternative RPD boost scenarios to the components and recalculate sampling error

EXTRACT OF DATA ANALYSED

- Monthly average audiences
- Large, small and niche demographics
- Large, small and niche channels
- Single platform channels

HYBRID SCENARIOS

- BARB TAM panel 5,000 homes
- Plus alternative RPD boosts

25,000 Homes with Demographics All Platforms

25,000 Homes with Demographics Single Platform

Census without Demographics All Platforms

Census without Demographics Single Platform

EFFECTIVE SAMPLE SIZE

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- The benefits of RPD vary by audience measurement
- Absolute sampling errors are important to understand – can very small channels ever come into play?
- But probably most useful to summarise performance in terms of gains in effective sample size:
  - the RPD hybrid performs like a TAM panel which is X times bigger

25,000 RPD WITH DEMOGRAPHICS

	Average TV Rating	Effective Sample	
		Adults All Platforms	Adults Single Platforms
Channel 1	2.81	X 3.5	X 1.2
Channel 2	0.17	X 3.4	X 1.2
Channel 3	0.03	X 3. 9	X 3.9

- Reasonably consistent across demographics
- Channel 3 has high platform share

CENSUS RPD WITHOUT DEMOGRAPHICS

	EFFECTIVE SAMPLE			
	All Platforms			Single Platform
	Adults	ABC1	Men 16-34	Adults
Channel 1	X 9.0	X 1.0	Less	Less
Channel 2	X 9.0	X 1.0	X 1.0	Less
Channel 3	X 11.0	X 2.0	Less	X 3.1

SAMPLING ERROR – RPD BOOST PERFORMANCE

- 25,000 Homes, With Demographics, All Platforms
  - significant improvement for all channels and demographics
- 25,000 Homes, With Demographics, Single Platform
  - limited improvement for multi-platform channels but no damage
- Census, Without Demographics, All Platforms
  - significant improvement for main category audiences
  - no improvement and often damage for demographic sub-groups
- Census, Without Demographics, Single Platform
  - consistent damage for multi-platform channels


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REMEMBER
THE RISKS

REMEMBER THE RISKS

These all need to be quantified because they WILL happen.

- Regression-to-the-mean
  - reach inflation
  - real variation in demographic profiles suppressed
  - co-viewing reduced (e.g. mothers and children)
  - switching between channels tends to random

REMEMBER THE RISKS

- Layers of control in modelled TAM panel components
  - danger of over-fitting

- Capping algorithm performance
  - predict if TV set is on and tuned to set-top-box

- Collection and maintenance of RPD households' person demographics
  - practicality and cost

Do the sampling error gains justify the risks?

YES

...for a well managed sample boost of RPD homes with person demographics:

- share of viewing by measurable programmes increases from 46% to 70%
- number of qualifying channels trebles
- single platform boost has limited value

NO

...for a census boost of RPD homes without demographics:

- larger programmes which account for 46% of all viewing will suffer loss of precision for demographic sub-group audiences
- single platform boost causes all round loss of precision for multi-platform channels

MAYBE

...for a census boost of RPD homes without demographics:

- if you ONLY want main category audiences for the long tail of channels and programmes


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RETURN PATH DATA
IN TAM PANELS
Is there a danger of sacrificing accuracy for more precision?

Yes, but it could be worse than that...

We may not even get more precision!