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# Life after the end of gender-specific pricing in Europe

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# Why go Gender-Neutral?



> 2004 EU Gender Directive

**“combating discrimination based on sex in access to and supply of goods and services, with a view to putting into effect in the Member States the principle of equal treatment between men and women”**

*Opt Out Clause*

**“permit proportionate differences in individuals’ premiums and benefits where the use of sex is a determining factor in the assessment of risk based on relevant and accurate actuarial and statistical data”**

# Why go Gender-Neutral?



- > 2004 EU Gender Directive
- > 2007 Enacted into national law
- > 2008 Test-Achats Belgian lobby group challenges opt out
- > 2011 European Court of Justice rules against opt out
- > 2012 Dec 21<sup>st</sup> G-Day
- > 2013 Jan 1<sup>st</sup> UK tax change
- > Retail Distribution Review

# Reactions of the UK & Irish markets



- > Gen Re survey of insurers late 2013
  - Reinsurance contacts, mostly actuaries

Distribution Channel	UK Responses	Ireland Responses
Independent Financial Advisers	10	4
Bancassurance	3	1
Other (Single Tie / Direct to Consumer)	2	2

- Questions dealt with
  - Expectations before G-day
  - Actual experience of the switch
- > Other data sources to understand actual experience

# Main concerns following the ECJ announcement



Rank	Concern	Number of mentions in survey (21 responses)
1	Estimating gender mix incorrectly	9 2 of which mentioned mismatch between gender-neutral office premiums and gender-specific reinsurance rates
2	Male lapse/re-entry or other customer selection	7
3	Pricing competitiveness	6 2 of which focussed on initial pricing
4	Operational capacity / pipeline management	5
5	Competitor innovations to manage business mix	3
5	Managing salesforce /customer expectations	3

Others:

Endorsements to existing contracts, Implementation cost,  
When best to switch, Initial lack of clarity of the ruling



# Using past data to estimate future gender mix

## Generalised Linear Model



- > Identify explanatory variables for gender mix using GLM
  - Logistic regression
  - Linear predictor =  $\beta_0 X_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots$
  - Proportion male =  $\frac{\text{EXP}(\text{Linear Predictor})}{[1 + \text{EXP}(\text{Linear Predictor})]}$ 
    - LP very negative:  $p \Rightarrow 0$
    - LP = 0:  $p = 0.5$
    - LP very large:  $p \Rightarrow 1$
- > Estimate co-efficients using maximum likelihood in GLM software
  - Also allow for interaction terms





**Split data** into a model set and test set

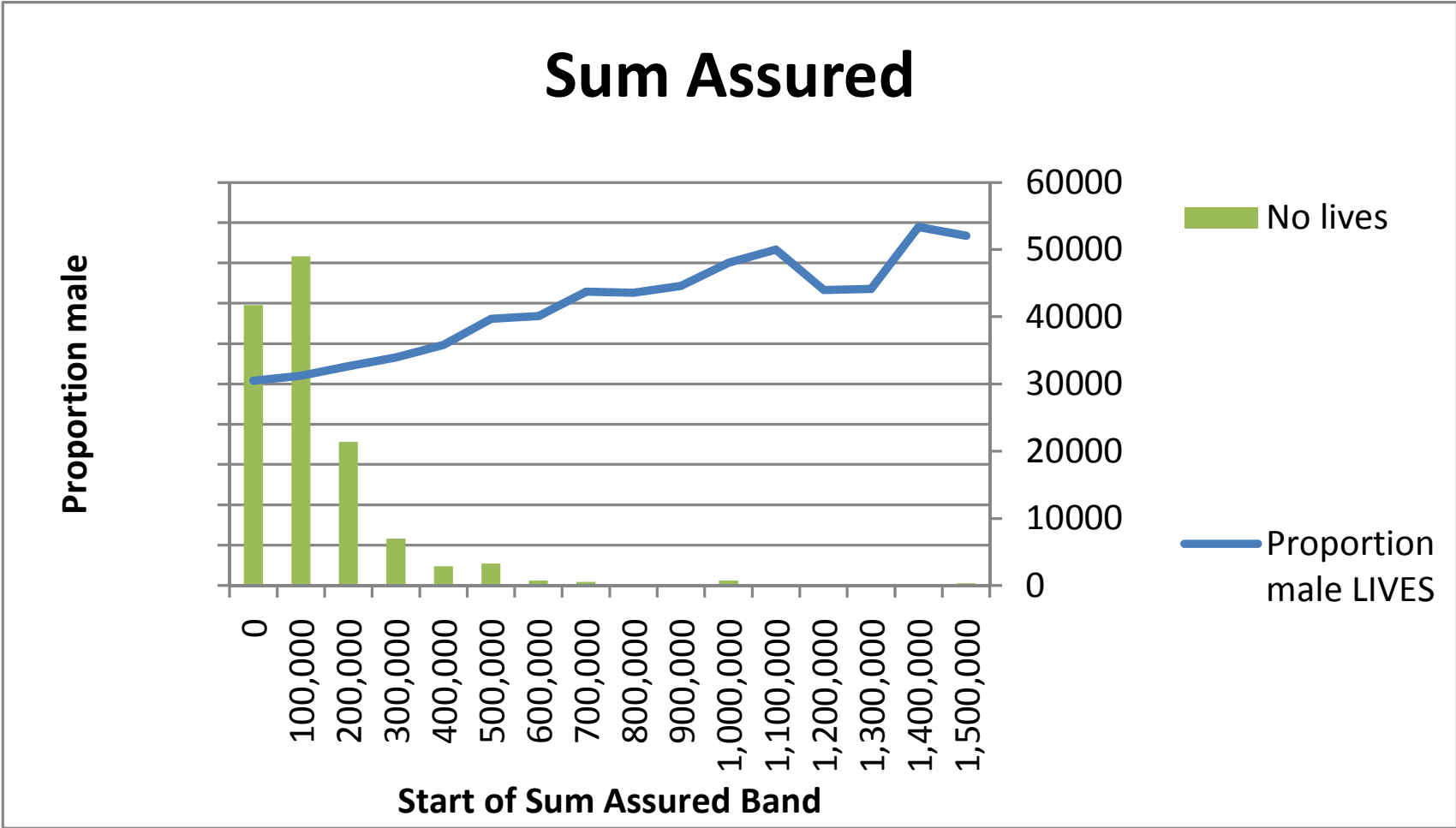
Using model set ...

1. Analyse **univariate results**, identify variables that may need transformation
2. Run a full **GLM without interactions**
3. Run some **alternatives** with different variable transformations
4. Run a **GLM with interactions** with the variables that were significant in steps 2 and 3
5. **Remove insignificant** independent variables and interactions
6. **Repeat** until you think you have the best model
7. **Test the fit graphically** by looking for biases and runs
8. Identify any causes for problems and transform variables to **correct**

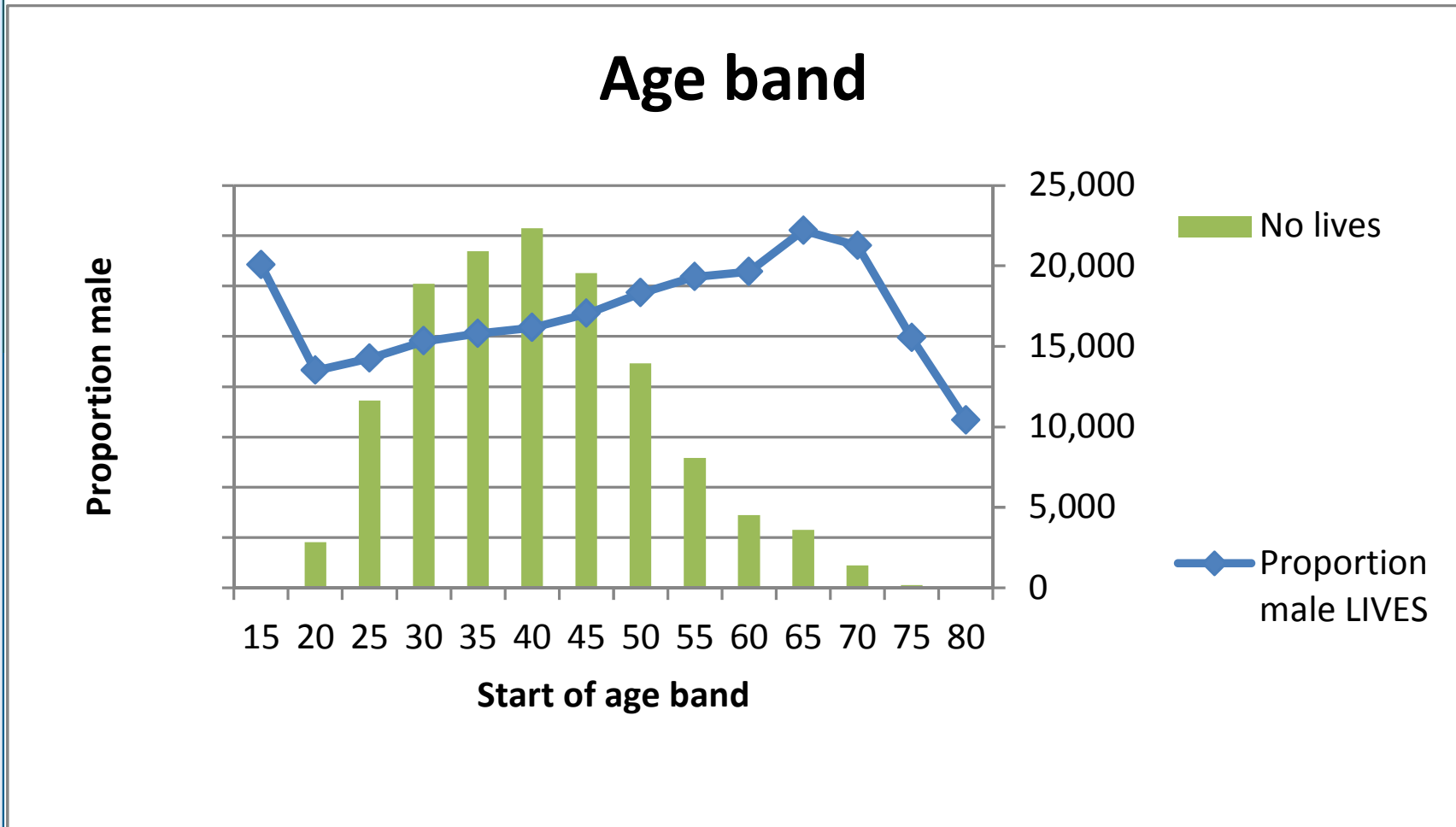


- > For a sample company we saw a higher proportion of males with
  - Increasing age, up to 65
  - Shorter policy term, levelling off at 20 years
  - Cease ages below 40 and over 60
  - Higher sum assured
  - Level/Increasing (vs Decreasing) sum assured
  - Smokers
  
- Occupation (indirect discrimination?)

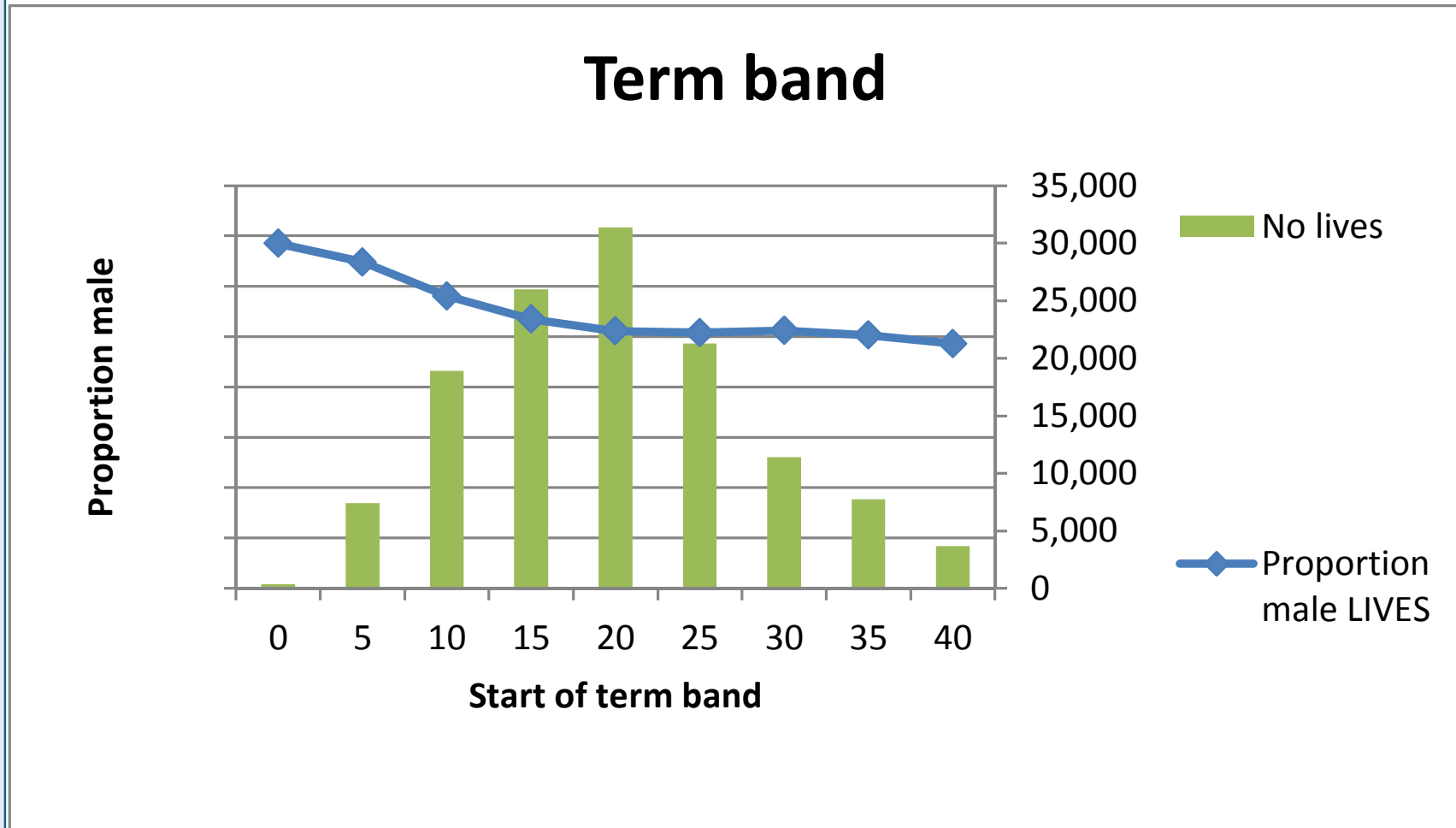
# Sum Assured shape – single life business



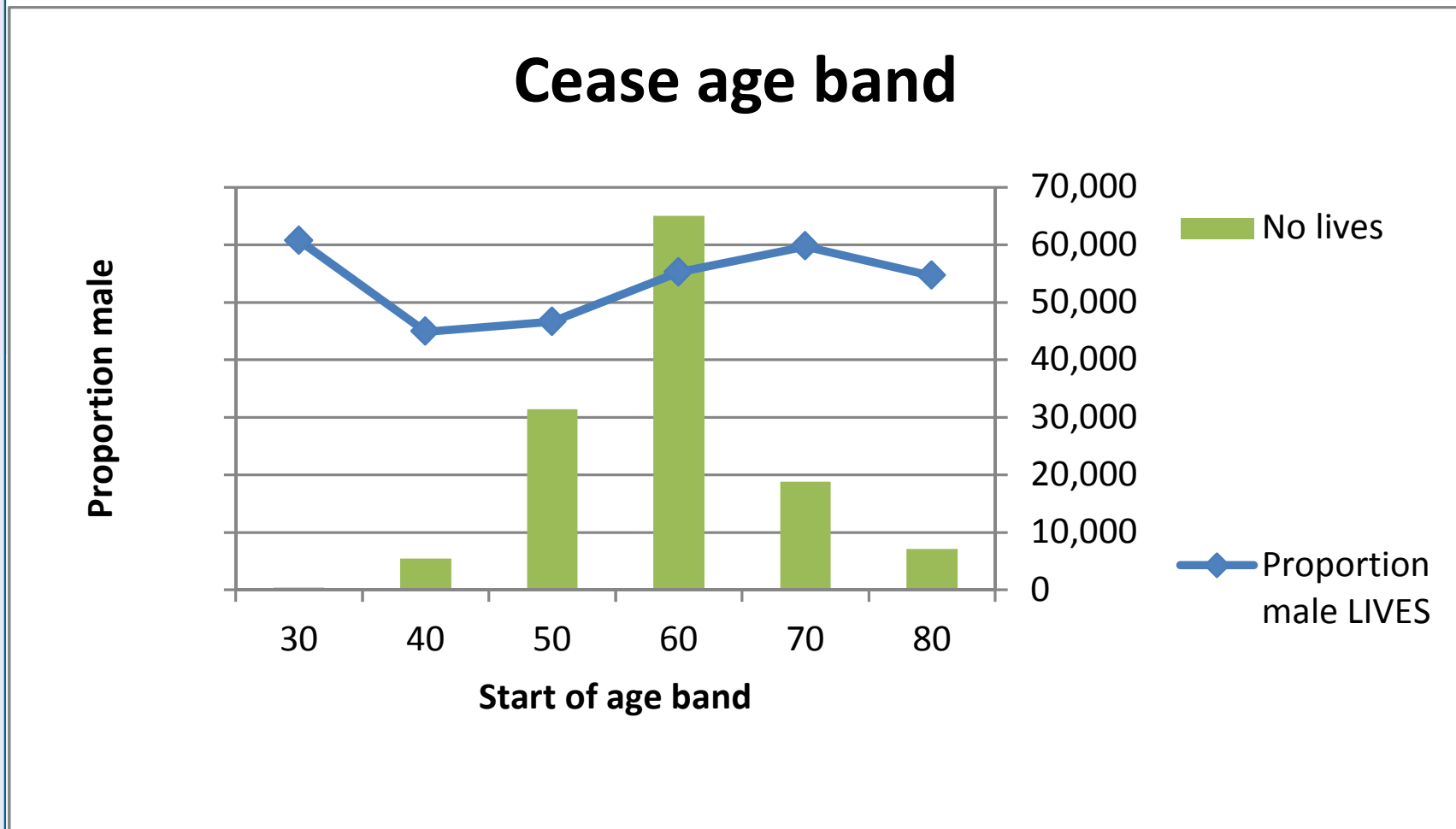
# Age shape – single life business



# Term shape – single life business



# Cease age shape – single life business



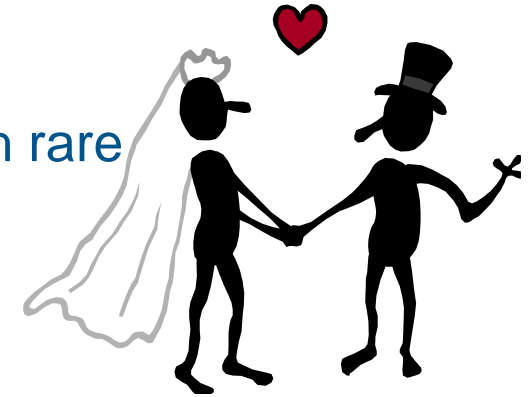
# Significant variables in GLM all p-values very close to 0%



Rank by Chi-squared value	Variable	Properties	Illustrative effect Baseline case age 40, 25-year term, Non-smoker, Level cover, £1m
1	Sum Assured	Continuous, capped at £1m	2.7% more males moving from £100k to £200k
2	Cease age	Categorical, 7 levels chosen by trial-and-error	5.8% more males moving from age 65 to 60
3	Cover type	Categorical, Data-defined	1.6% more males Level vs Decreasing cover
4	Age at entry	Continuous, capped at 65	0.3% more males for a 1-year increase in age
5	Smoker status	Categorical, Data-defined	3.9% more males if a smoker
6	Policy term	Continuous, capped at 20 years	0.4% more males moving from 20-year term to 19 years

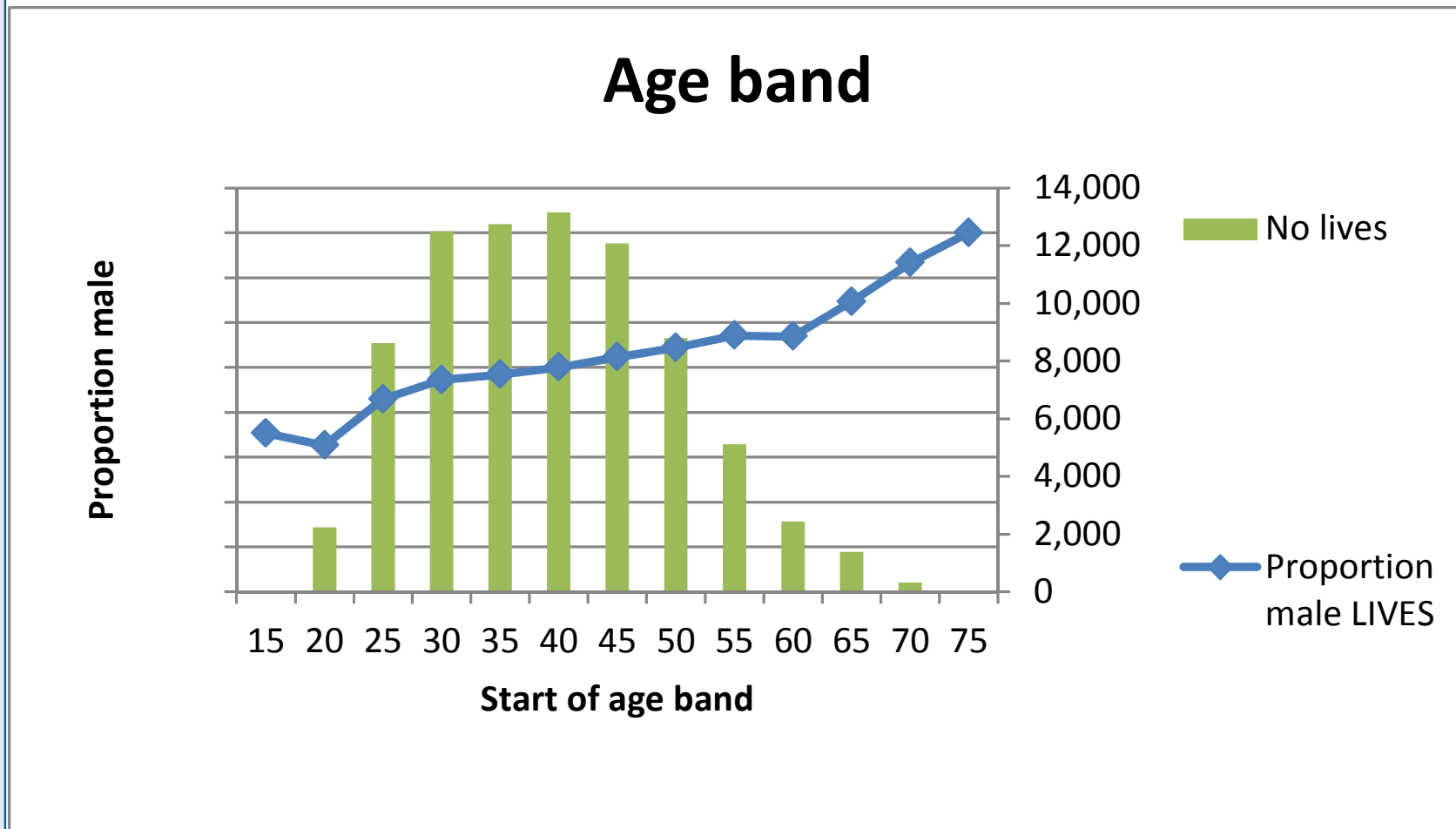


- > Mostly purchased by male / female couples with rare exceptions
  - Business partners
  - Civil partnerships
- > 50 / 50 gender split by factors that are the same at a policy level, except policy term
  - Short policy terms are associated with business covers
- > Not 50 / 50 by age!
  - Male spouse tends to be older



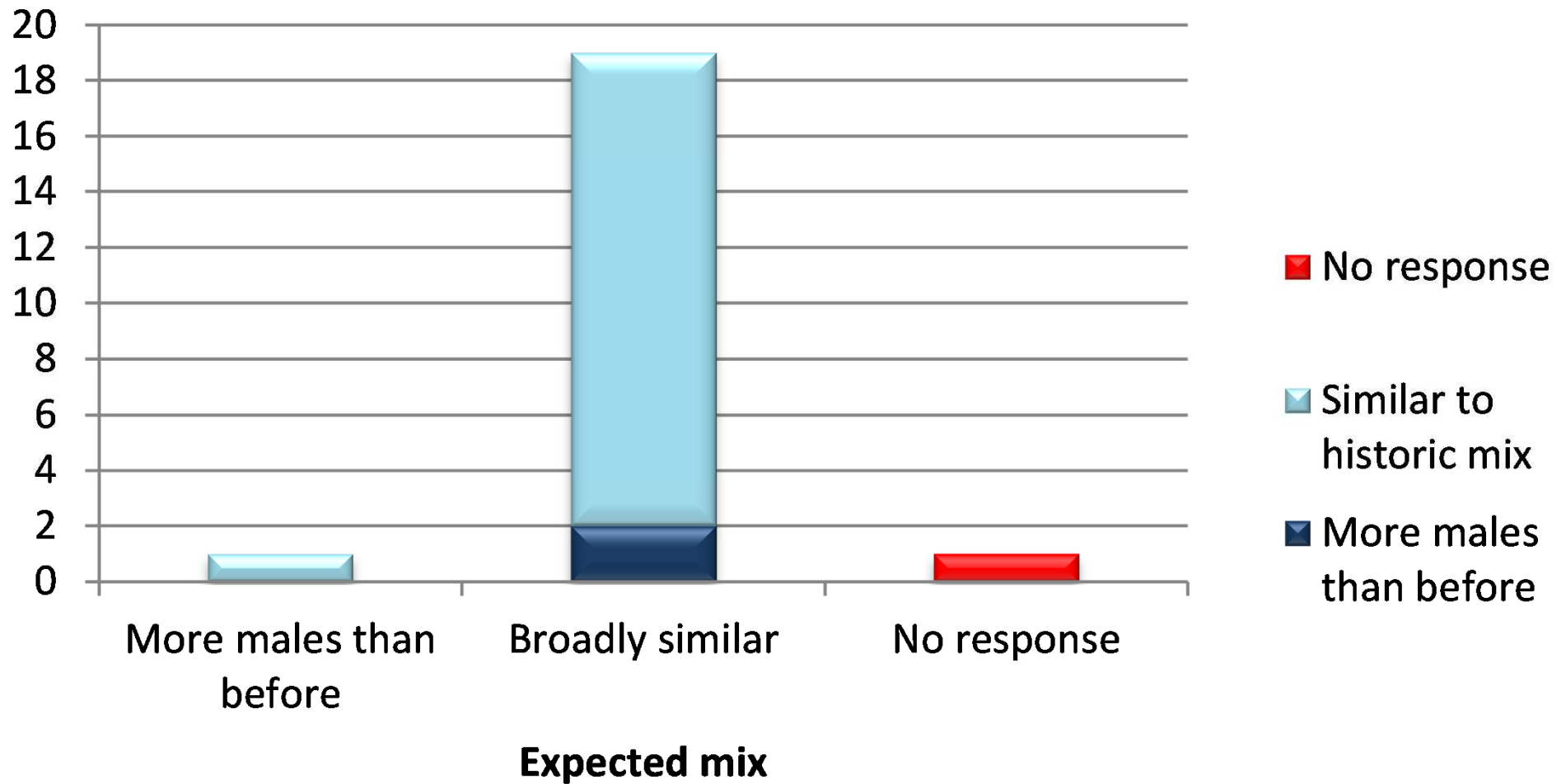


# Joint Life age shape





## Mid-2013 Actual Mix (n = 21)





So what happened around G-day?

# Concerns in the run up to G-Day

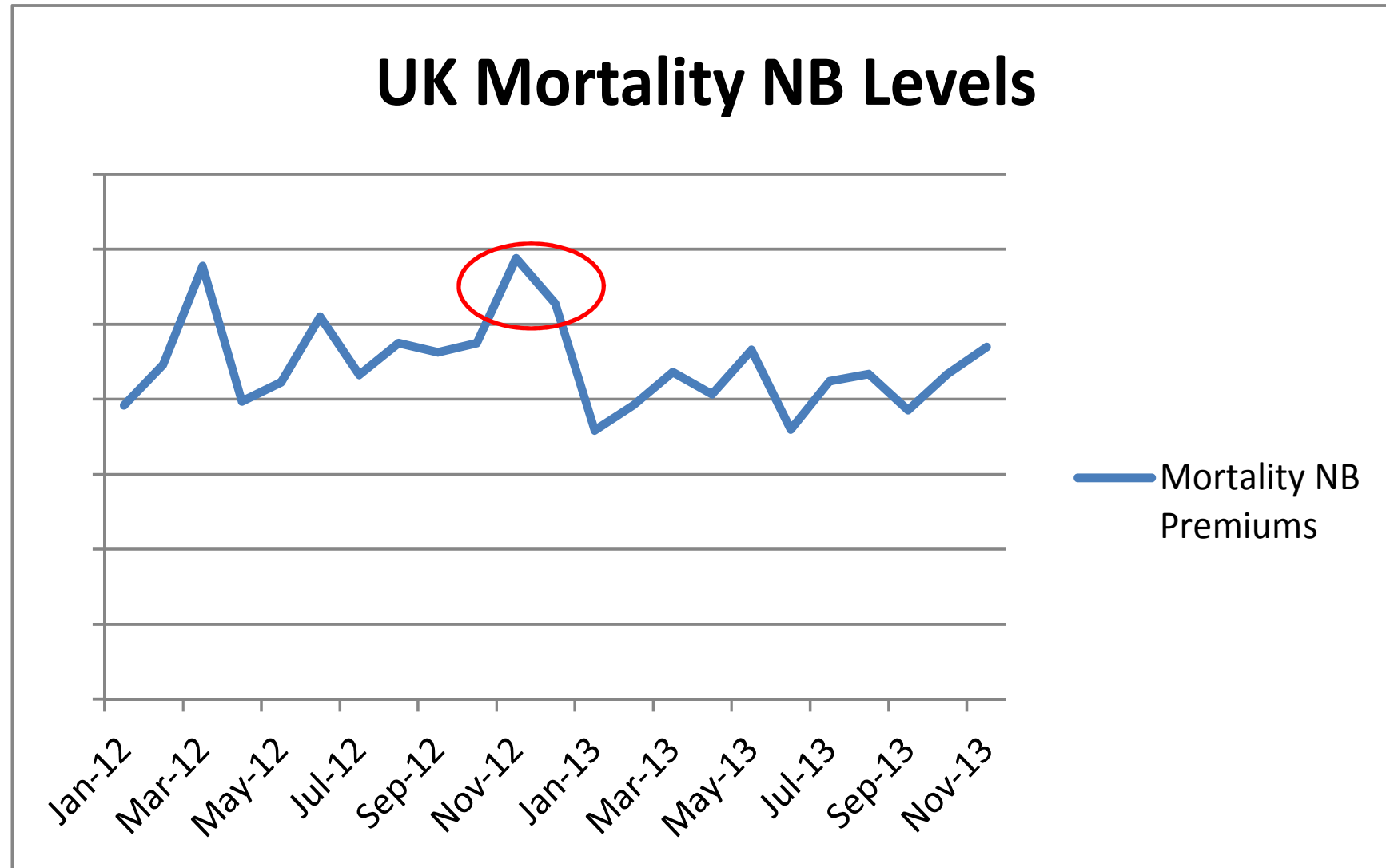


- > Was there going to be a fire-sale from a rush on female policies?
- > Would there be a risk from more male lives immediately after?
- > What date should a company change to gender neutral:
  - Impact on sales
  - System and resource limitations
- > Product innovations to attract policyholders

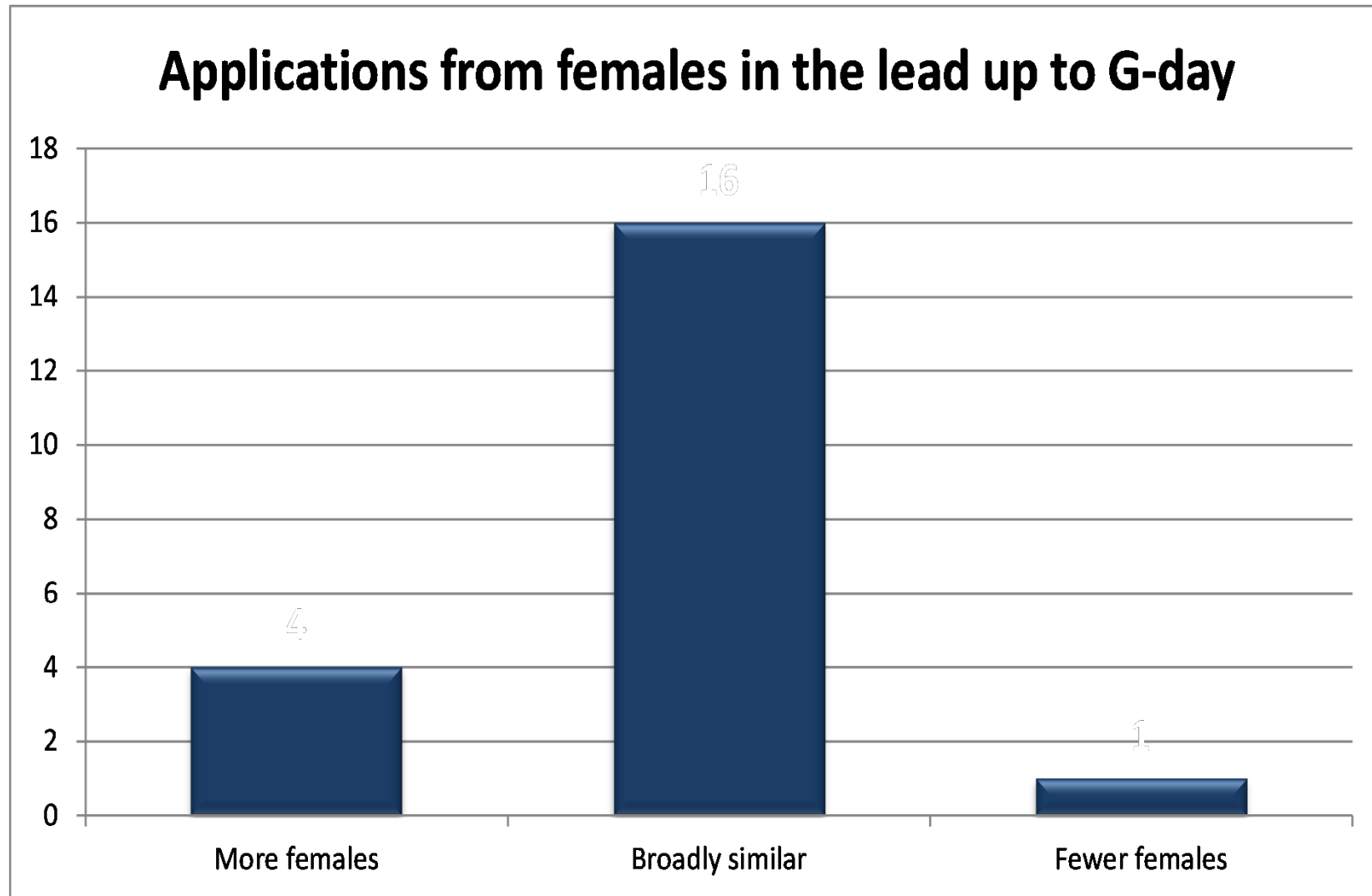
# Was there a fire-sale?



## UK Mortality NB Levels

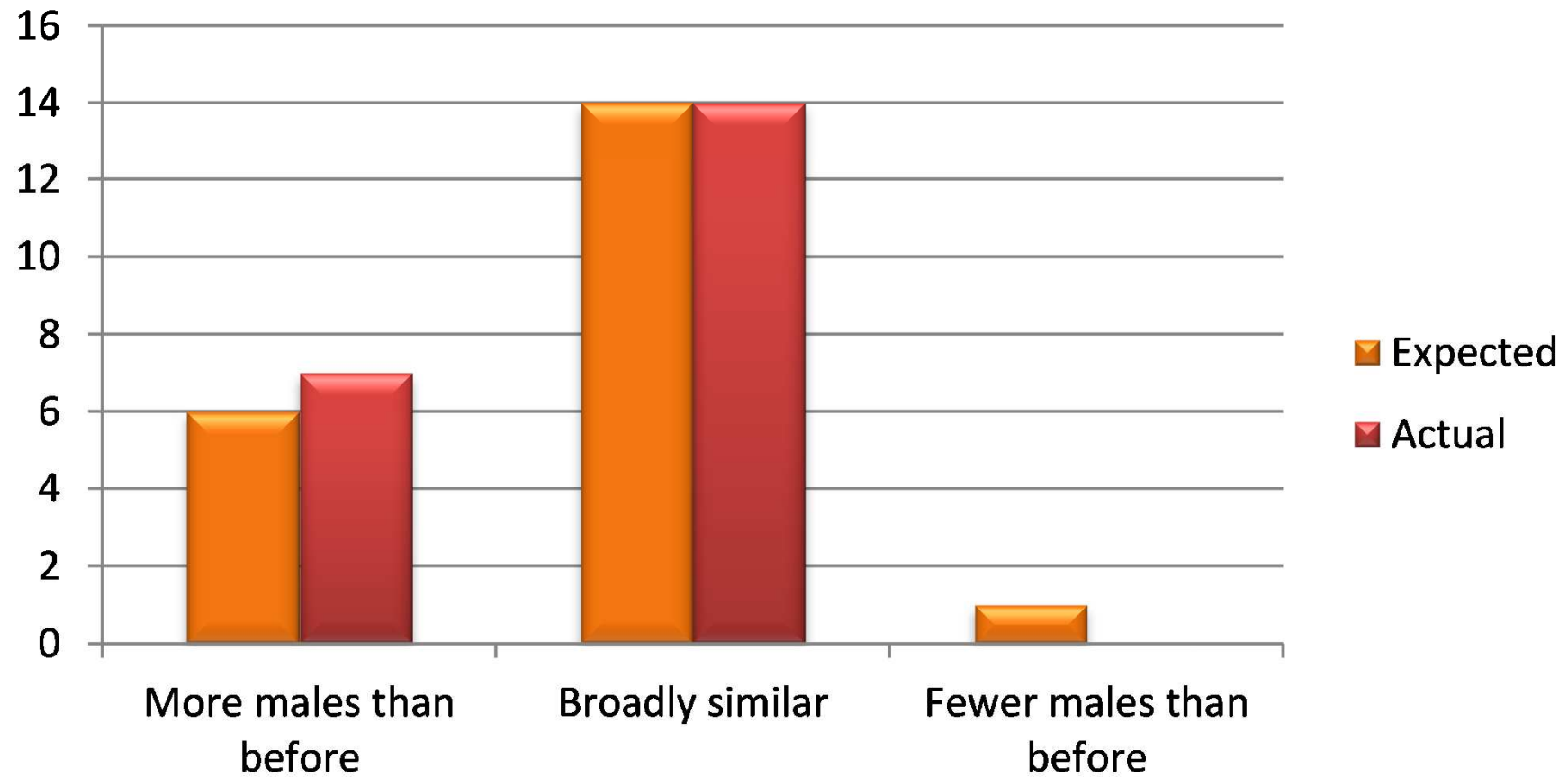


# Caused by a rush on female business?

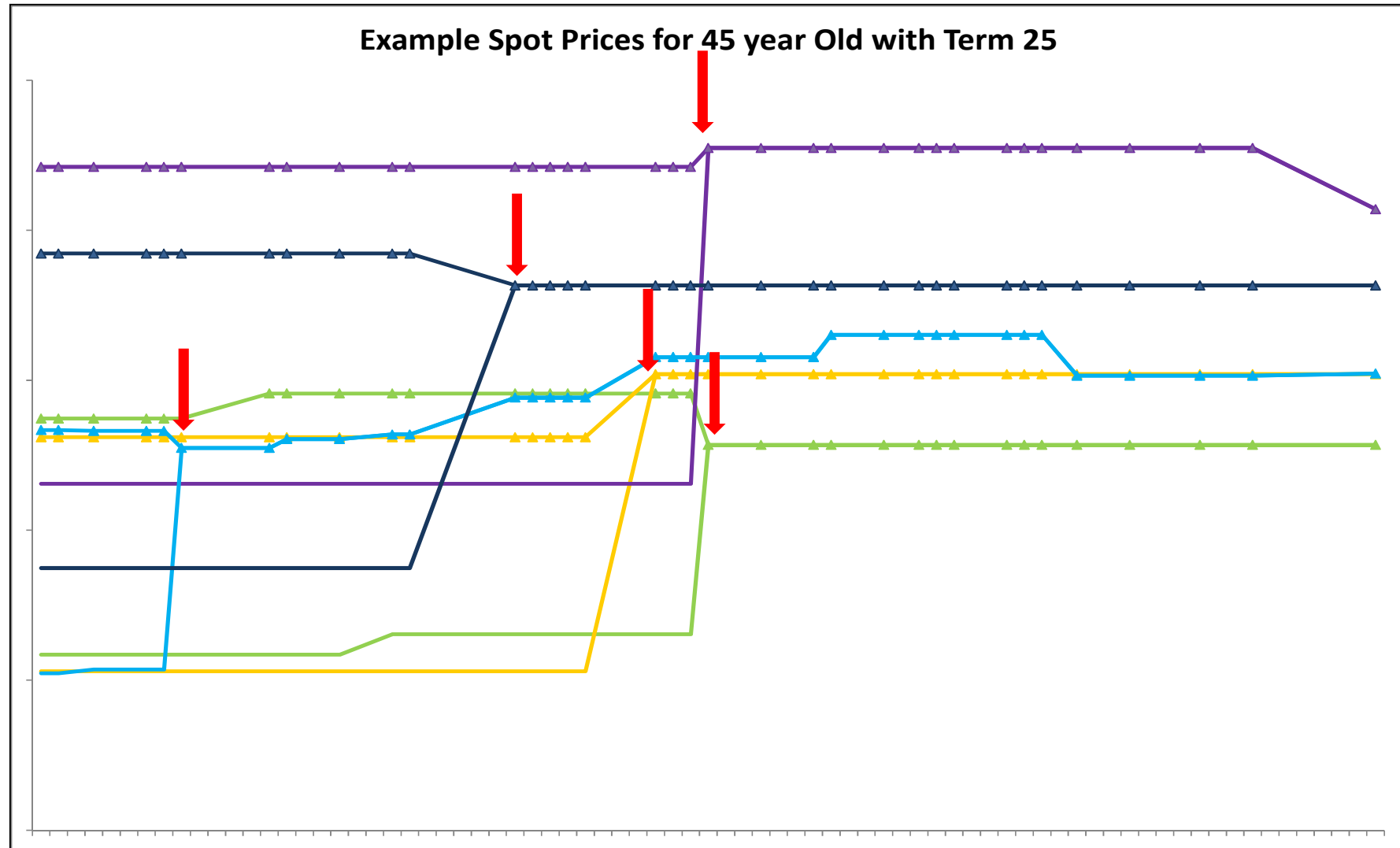




## January 2013 Actual Mix (n = 21)



# Move towards male rates

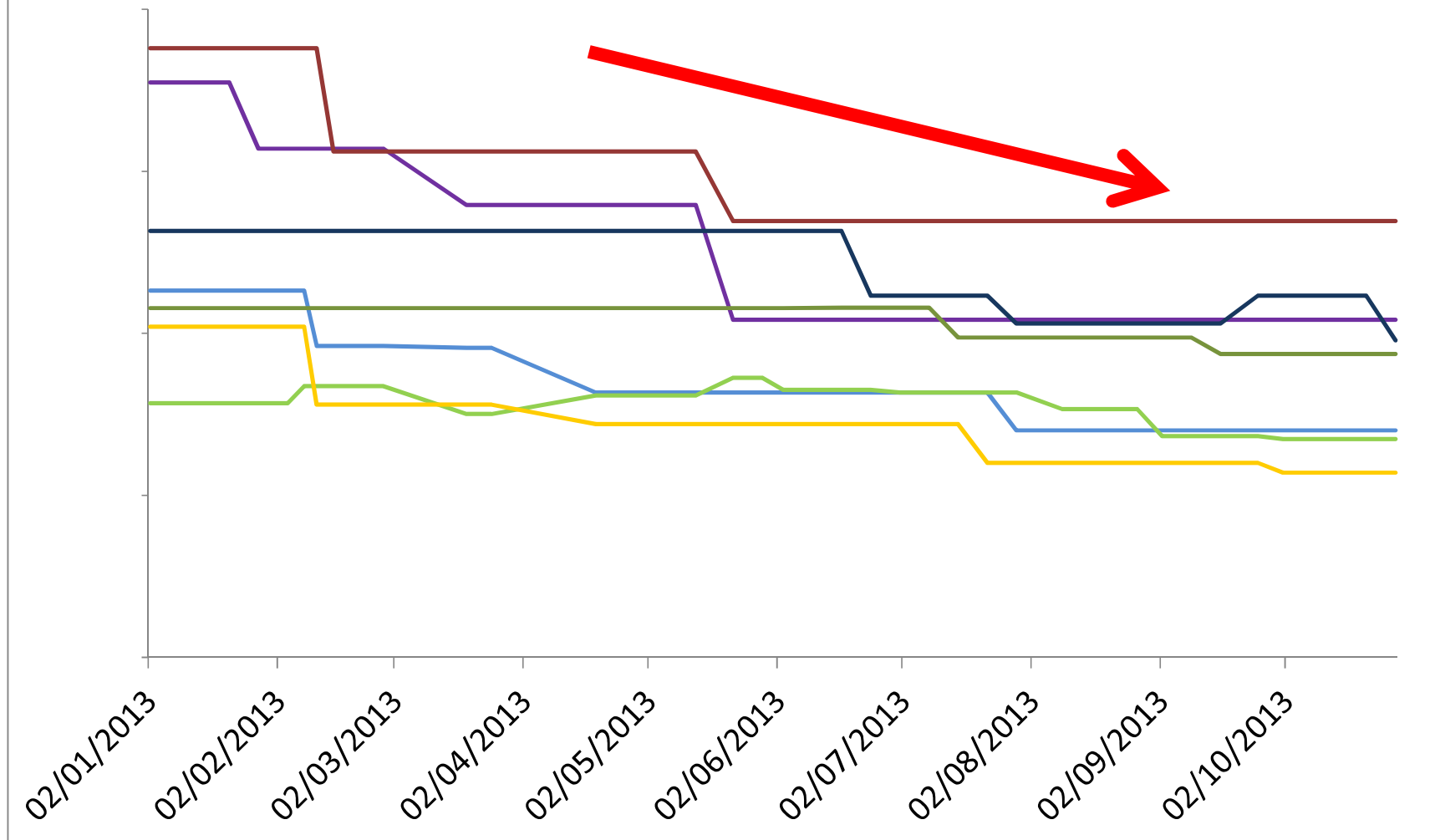




# Gradual move back towards historic mix



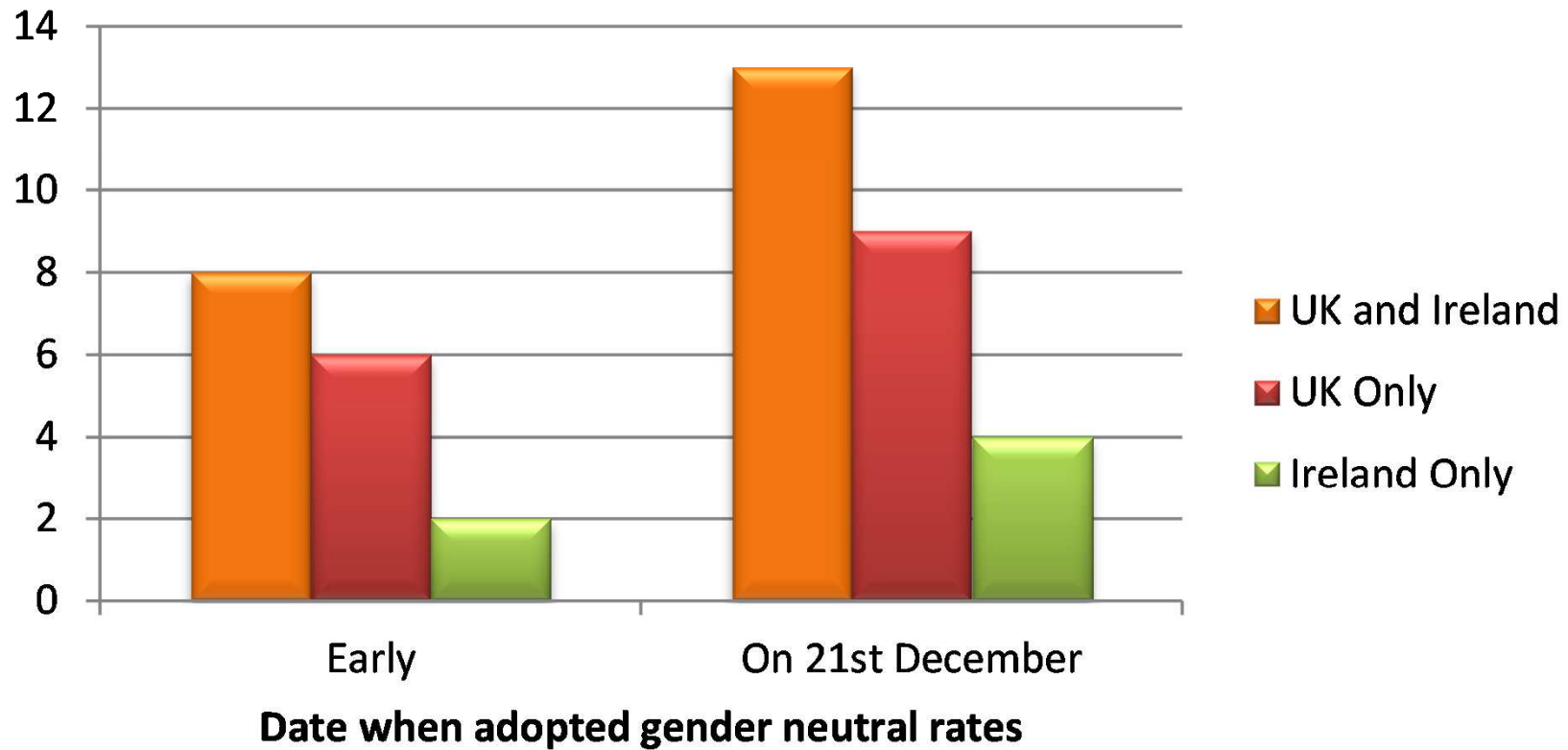
### Example spot prices from Jan 13 to Oct 13



# Which date to go Gender neutral?



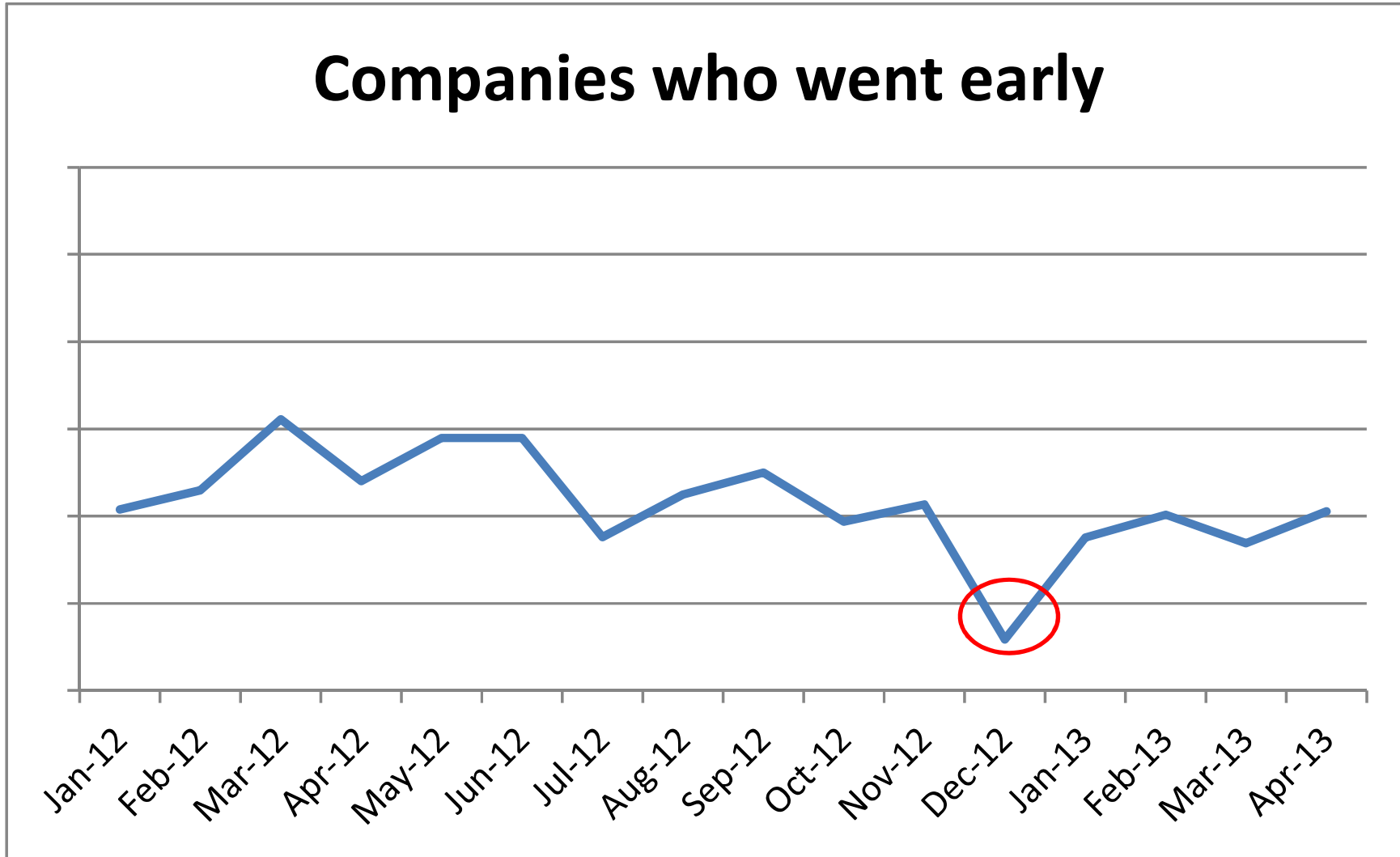
## January 2013 Actual Mix (n = 21)



# What happened to those that went early



## Companies who went early



# Other methods at changeover

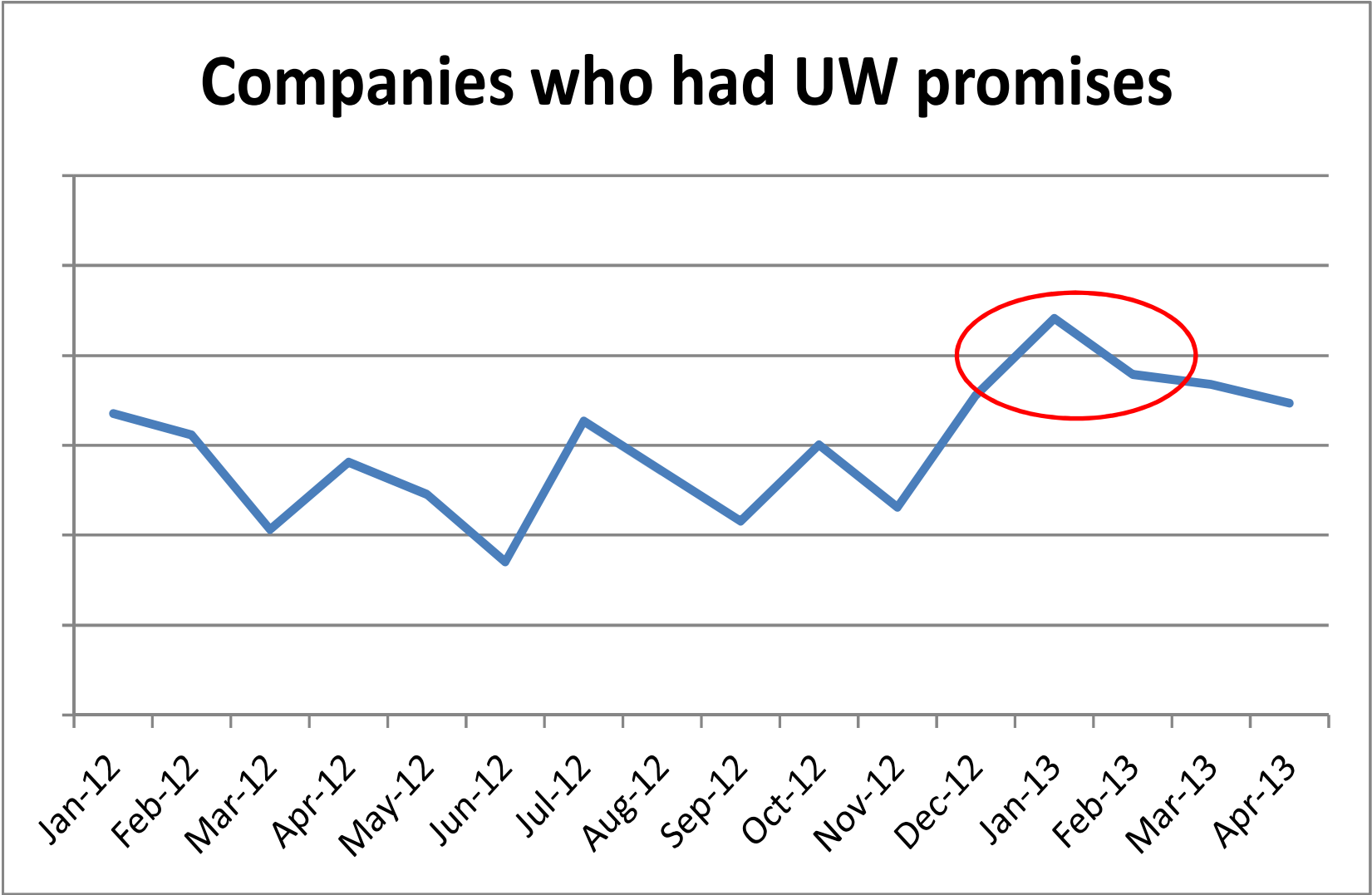


	Variable	Number	Percentage
a	Gender neutral rates from change date	15	71%
b	Gender specific rates on estimated UW decision with right to amend later	2	10%
c	Temporary cover for accidental death with full gender specific rates once UW completed	1	5%
d	Other	2	10%
e	No response	1	5%

# Did these methods assist?

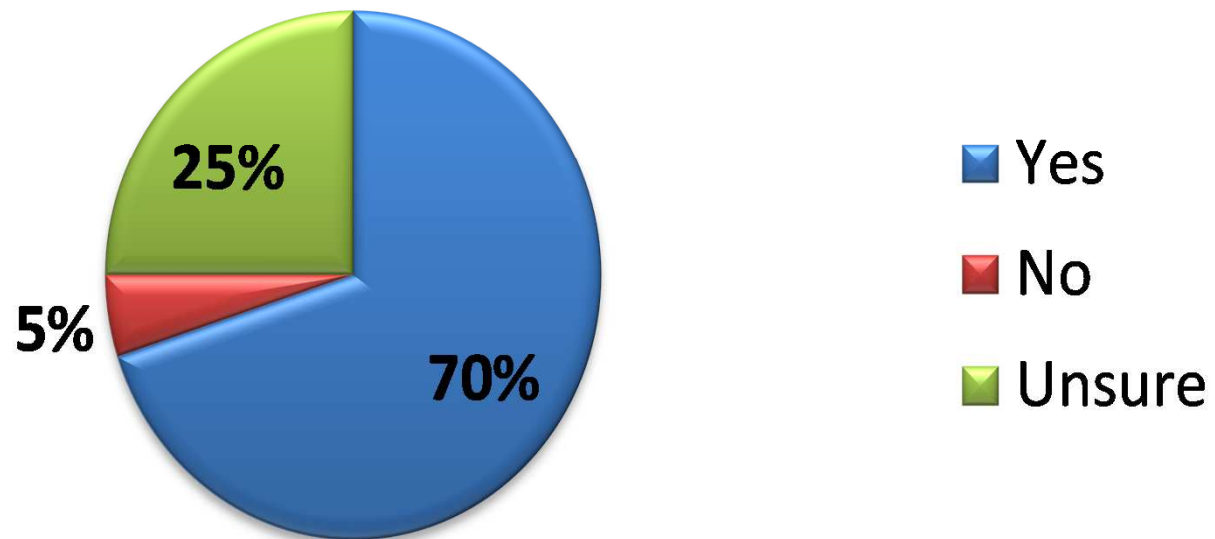


## Companies who had UW promises



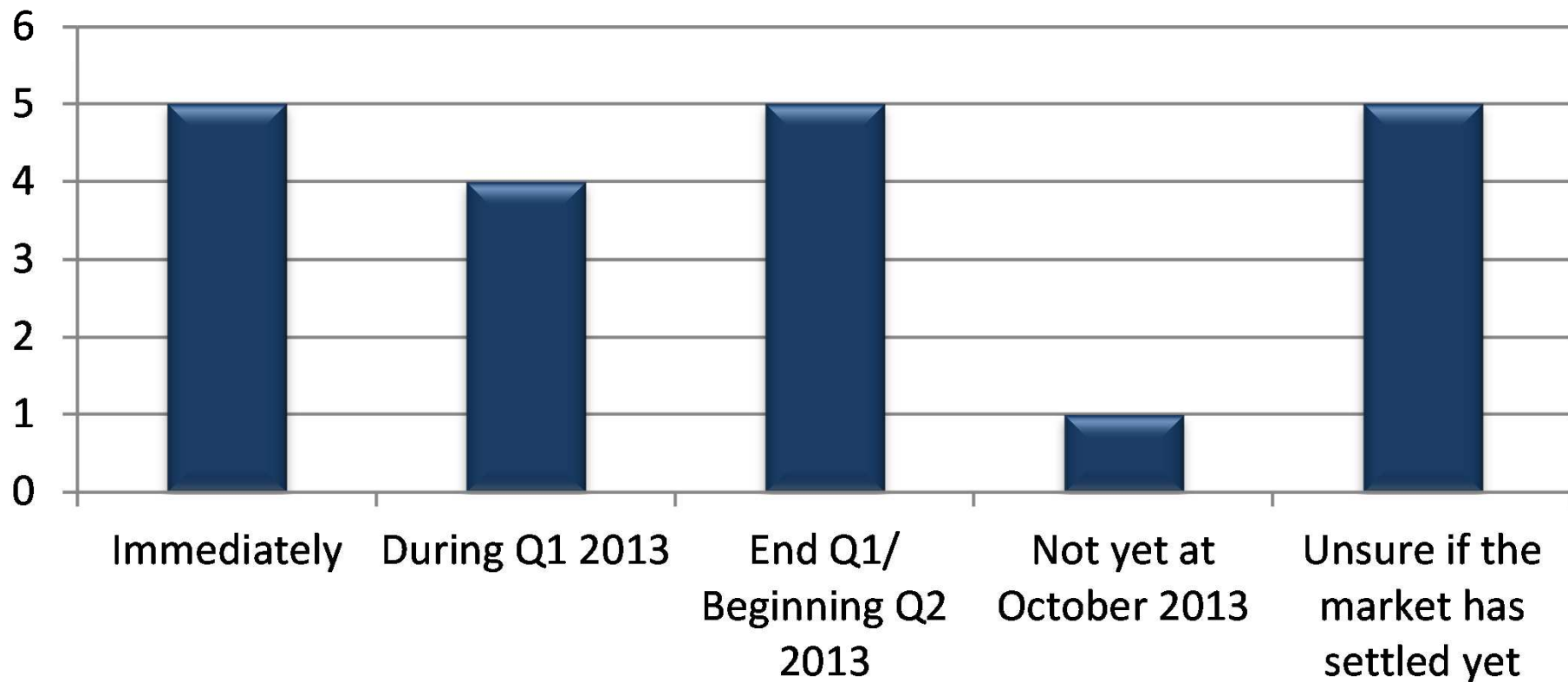


## Has the market mix settled down? October 2013 (n = 20)





## When did the market gender mix settle down? (n = 20)



# Actual issues encountered

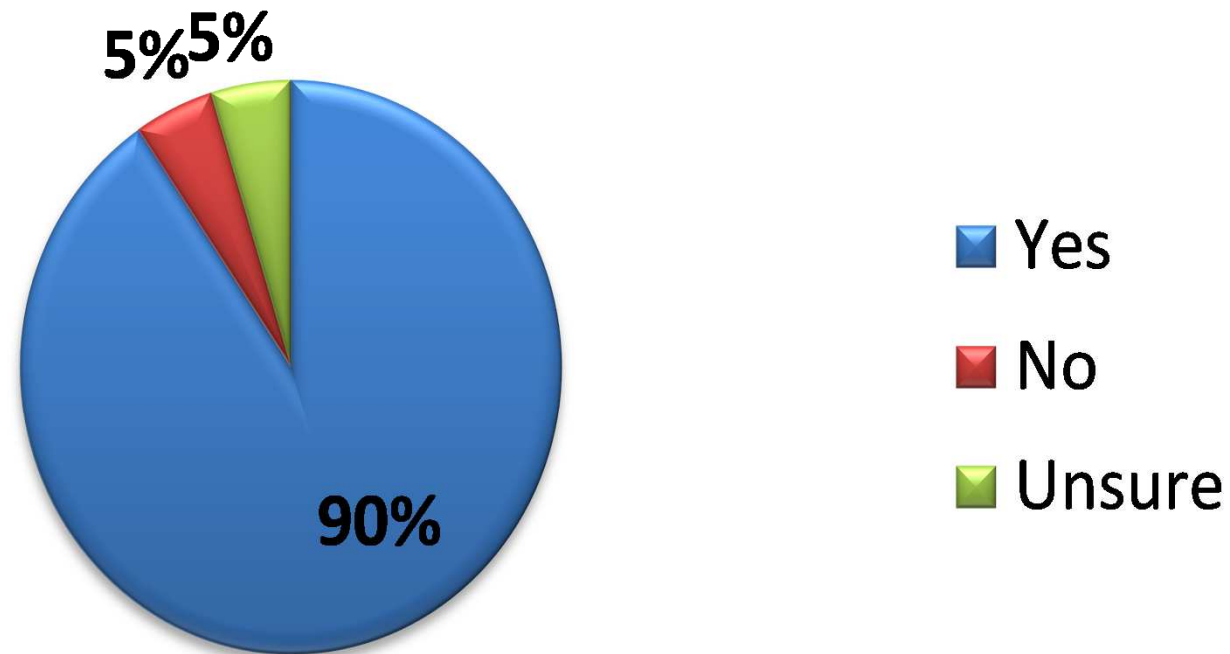


Rank	Issue	Number of mentions in survey (21 responses)
1	Low volumes at the start of 2013	6
2	Operational capacity	4
3	Regulatory changes (tax / RDR)	3
3	Adverse gender mix	3
3	No big issues	3
6	Pricing disruption early on	2
6	Business mix risk attached to mismatch between gender-neutral office rates and gender-specific reinsurance rates	2





## Would you return to Gender Specific rates?





- > Gender change created concerns around mix assumptions
  - Actuarial techniques like models employed
- > Short-term market disruptions
  - Date of change and initial assumptions important
  - Other factors (Tax and RDR) complicated matters
- > Market settled down and future mixes expected to be stable
- > Gender neutral may suit certain distribution lines
  
- > Maybe Pink and Blue products explored in future



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