Long-term sustainability of medical schemes

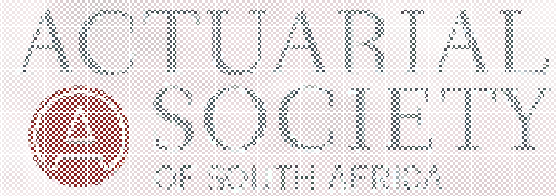Christoff Raath

The Health Monitor Company

Background

"In the long term, we are all dead"

- John Maynard Keynes, 1923

Agenda

1. Background and context

2. Ageing inflation

3. Case studies

4. Long term valuation bases

5. Regulatory developments

Long-term related questions

- Is it appropriate for high-solvency schemes to temporarily dip into loss-making positions?

- Are PRMA valuation bases generally coherent with the realities of underlying schemes?

- What is an appropriate basis for the evaluation of a medical scheme amalgamation?

- What kind of (and how many) new entrants does a scheme need to ensure sustainability?

- Under which circumstances can a scheme fund future expenditure from of future contributions?

Long-term
- Traditional actuary
- 20 or more years
- Contribution increases lower than investment returns

Short-term
- Regulatory emphasis
- Non-traditional actuary
- Medical scheme product design
- One to three years
- Contribution increases in excess of CPI(X)+3
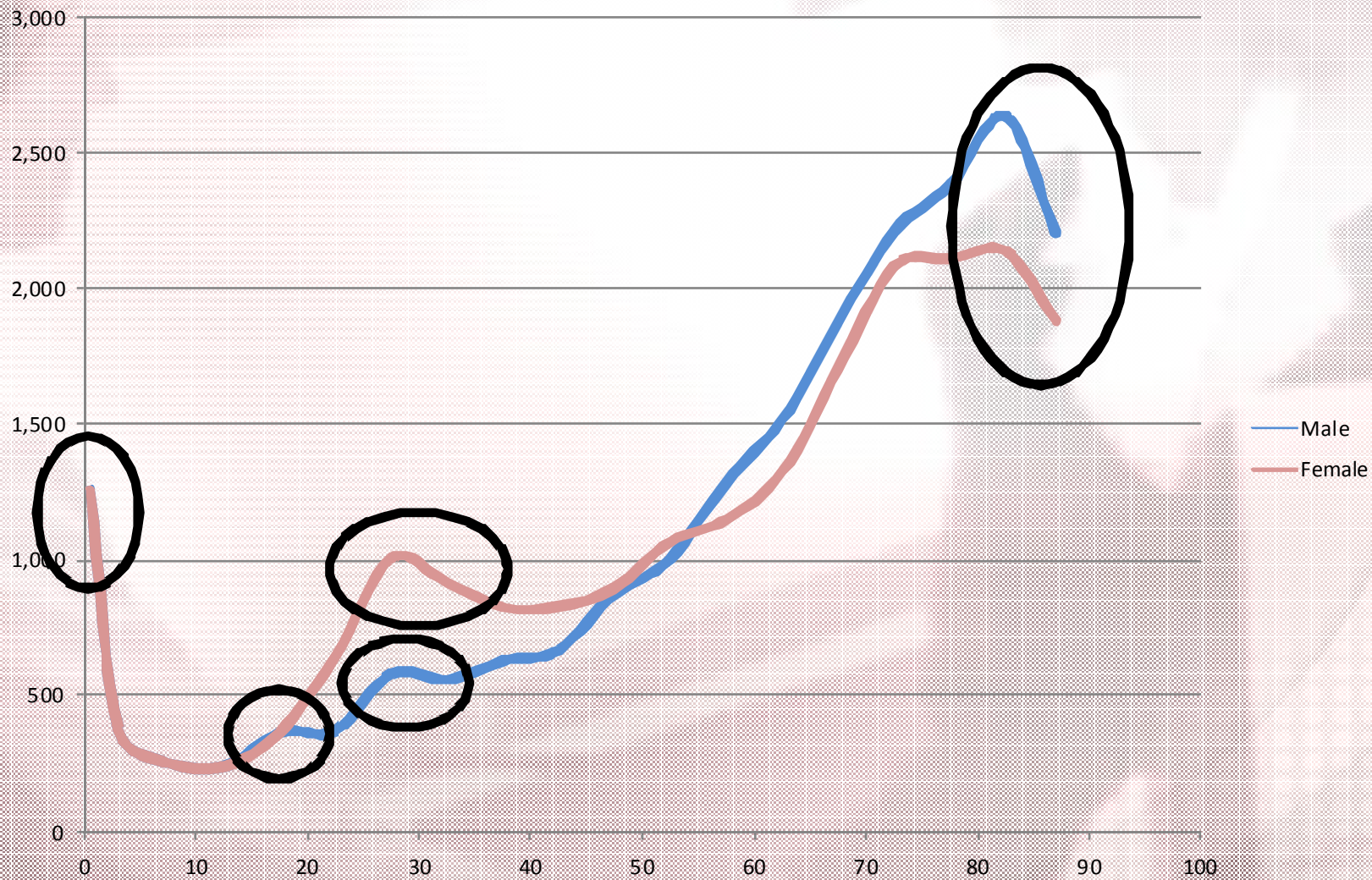
ACTUARIAL SOCIETY
OF SOUTH AFRICA

Aim

- Realistic present-day medical scheme case studies

- Determine circumstances under which sustainability is attained

  - Loss ratios

  - Contribution increases

  - Claims inflation

  - Investment return

  - New entrants
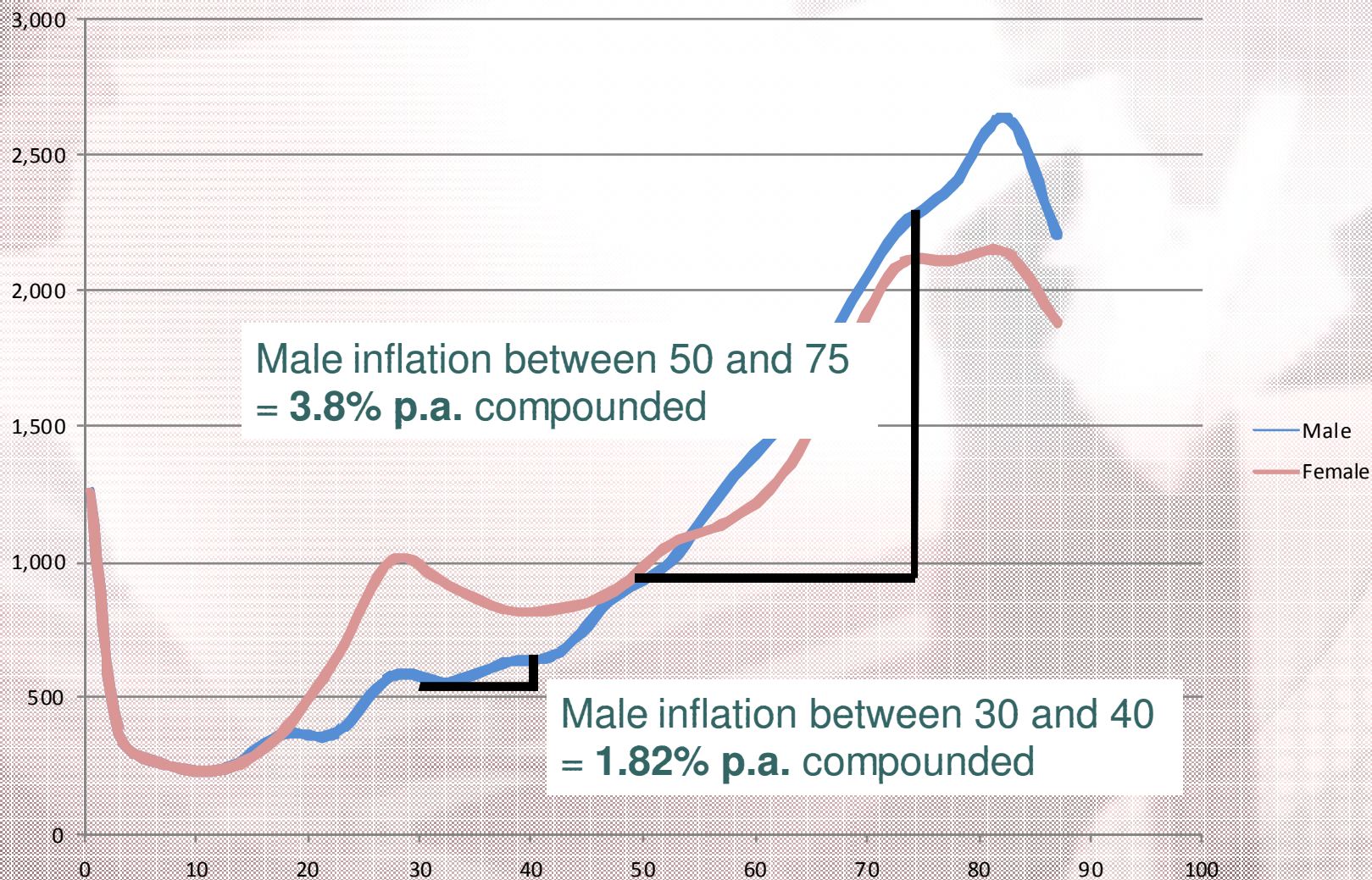
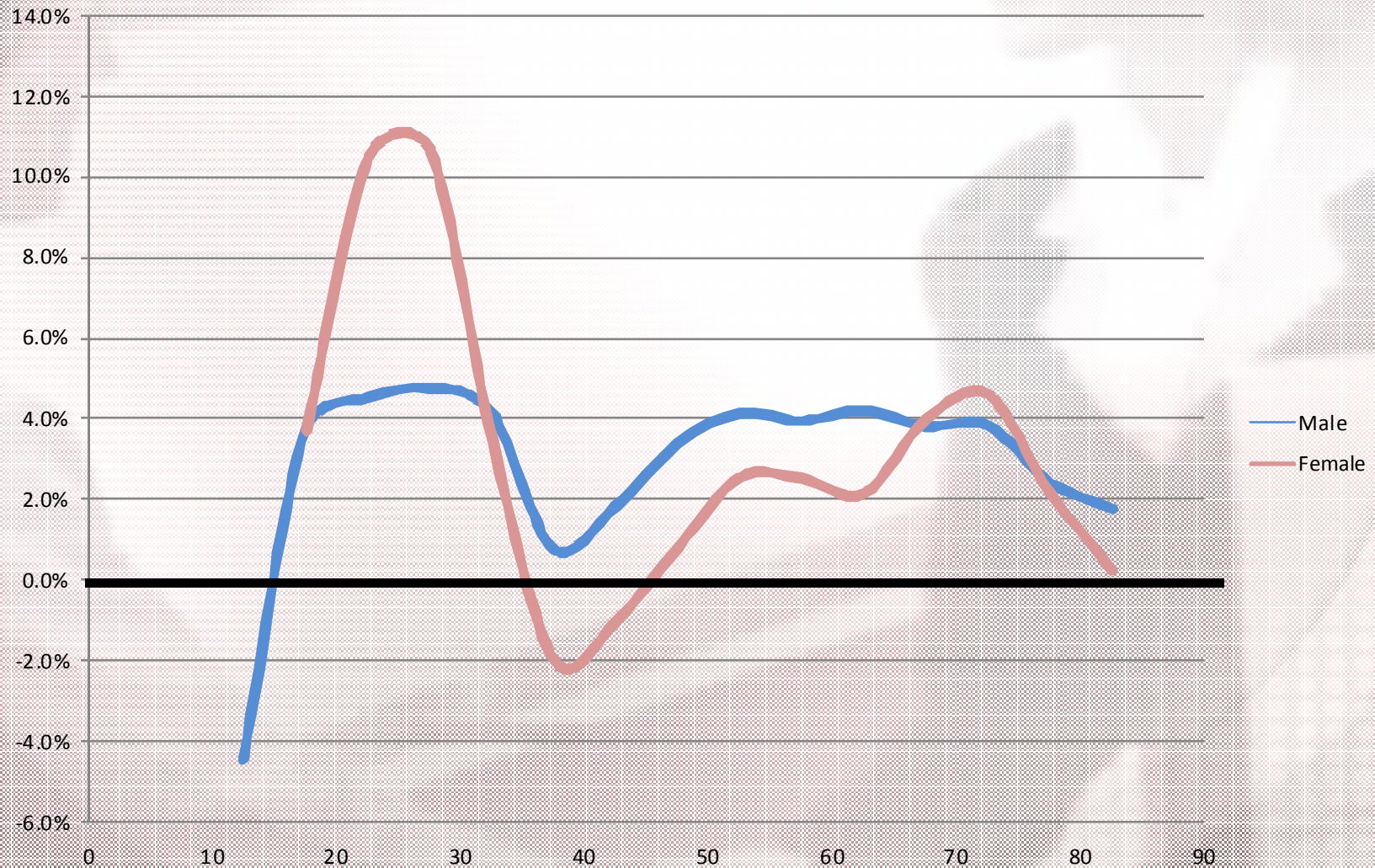 - Mortality

  - Membership lapses

Ageing inflation

ACTUARIAL SOCIETY
OF SOUTH AFRICA

Claims curve

Ageing inflation

Male inflation between 50 and 75
= **3.8% p.a.** compounded

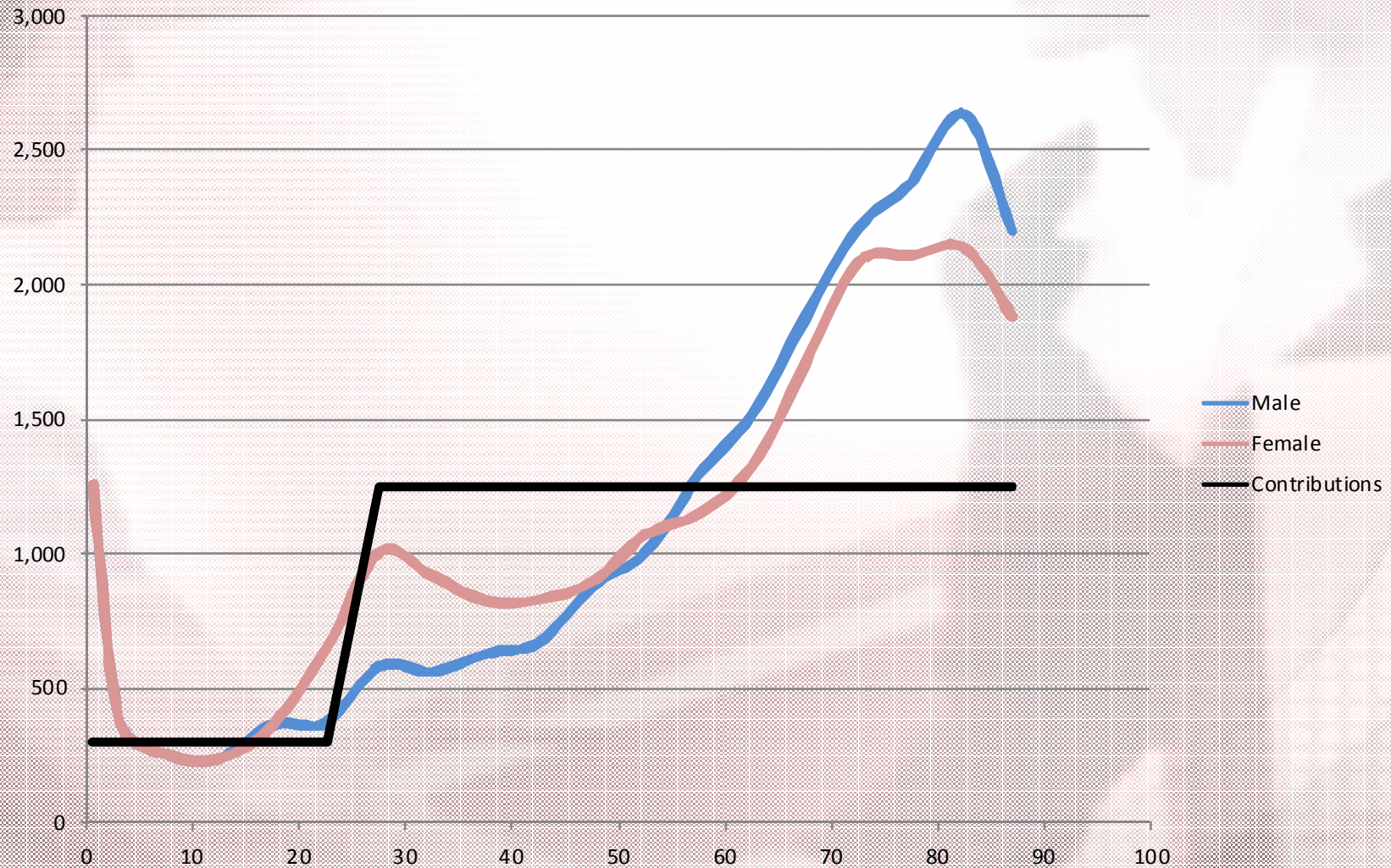Male inflation between 30 and 40
= **1.82% p.a.** compounded
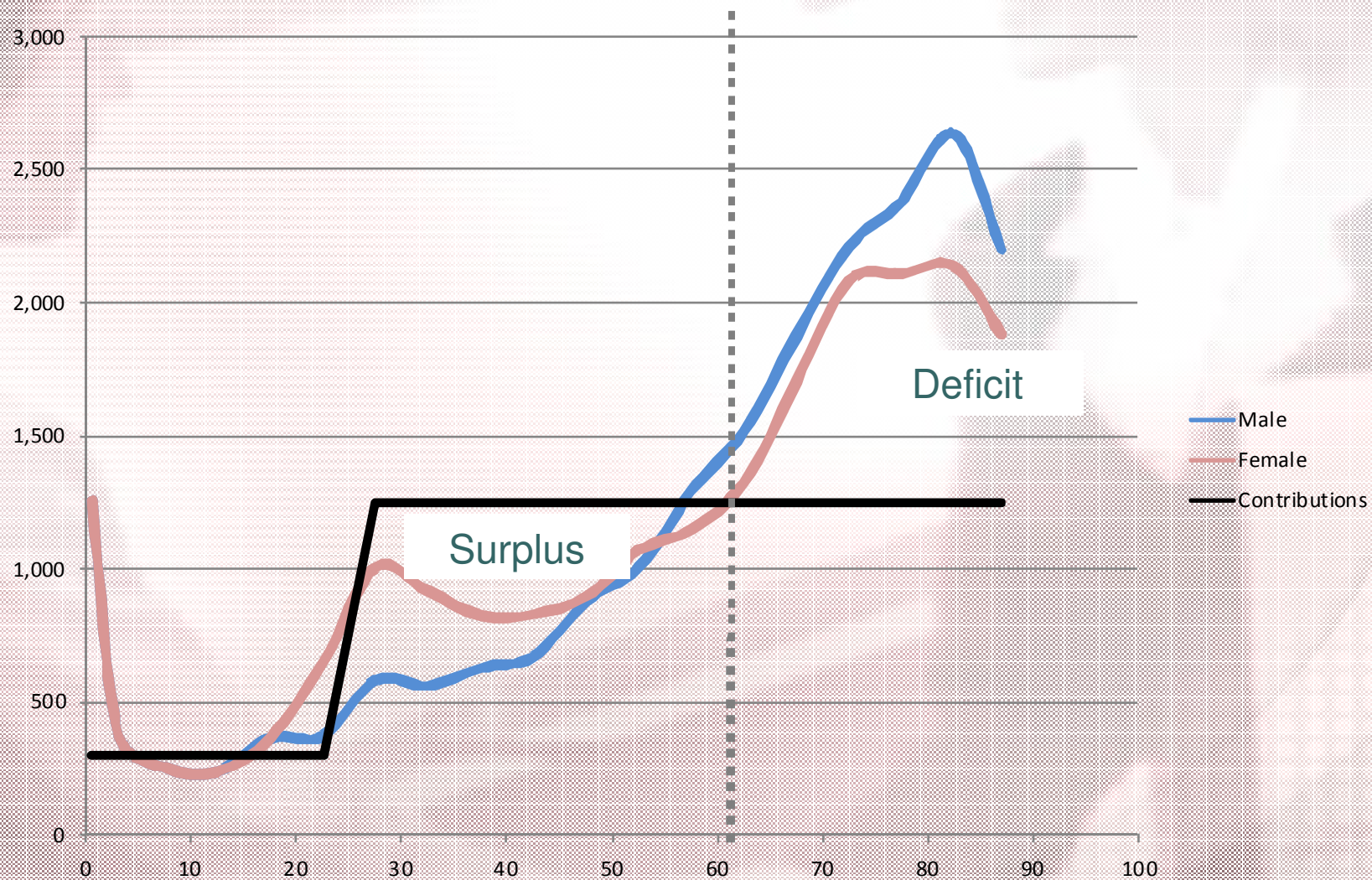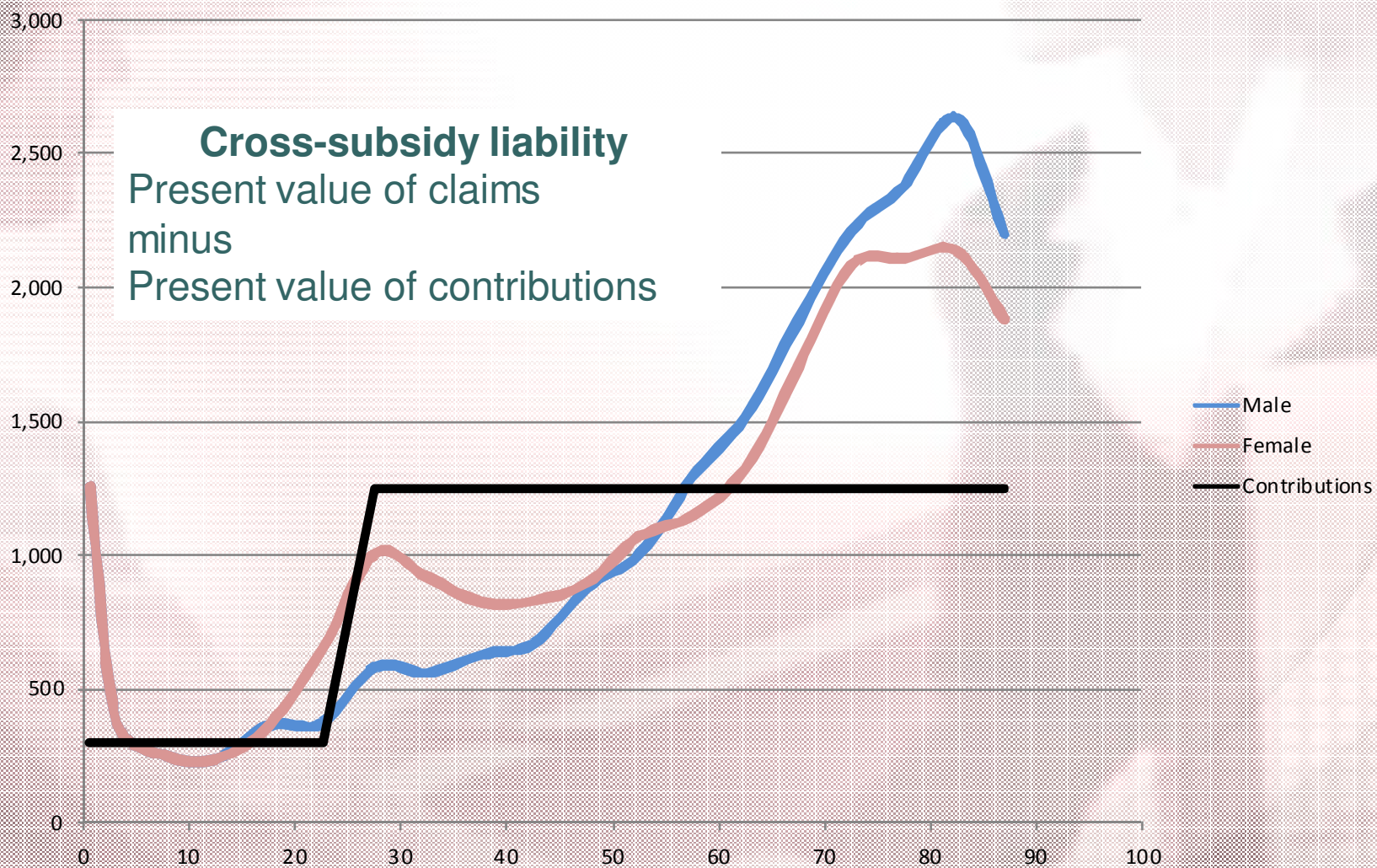
Male

Female

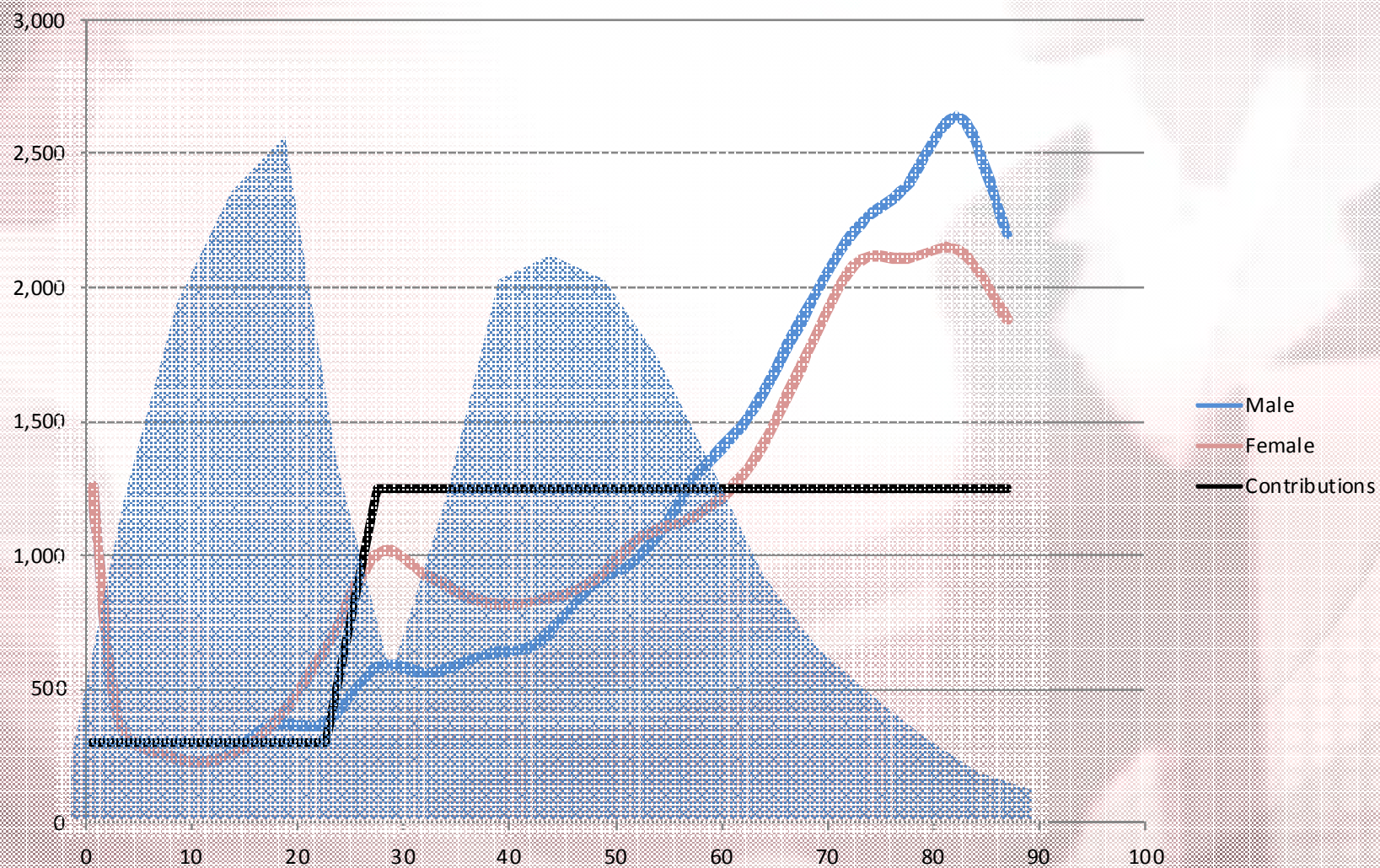# Ageing inflation

Claims vs contributions

Claims vs contributions

Claims vs contributions

Cross-subsidy liability
Present value of claims
minus
Present value of contributions

Claims vs contributions

Claims curve and mortality
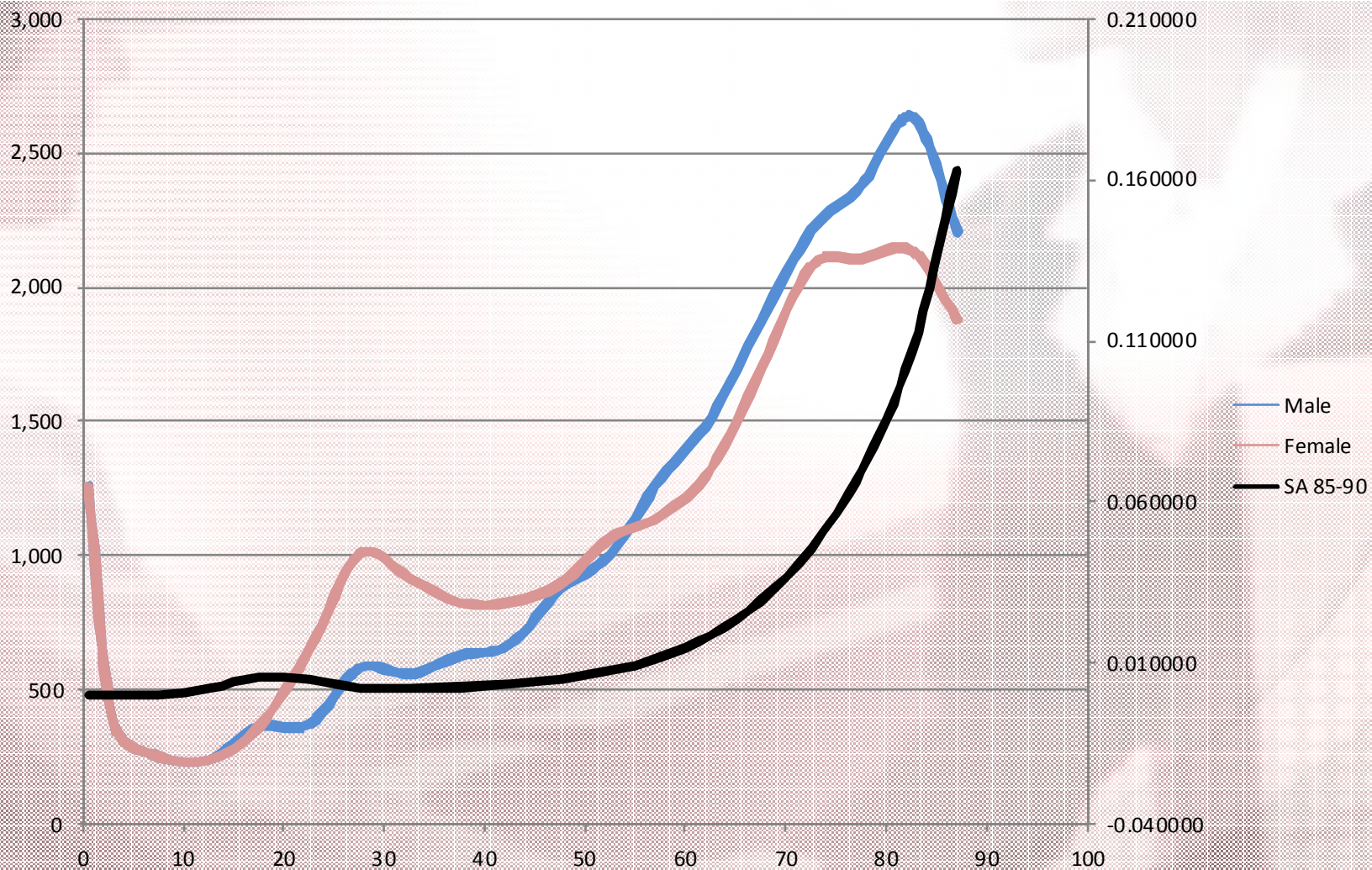
Mortality-adjusted ageing inflation

Legend:
- Male, no mortality
- Male with mortality
- Female, no mortality
- Female with mortality
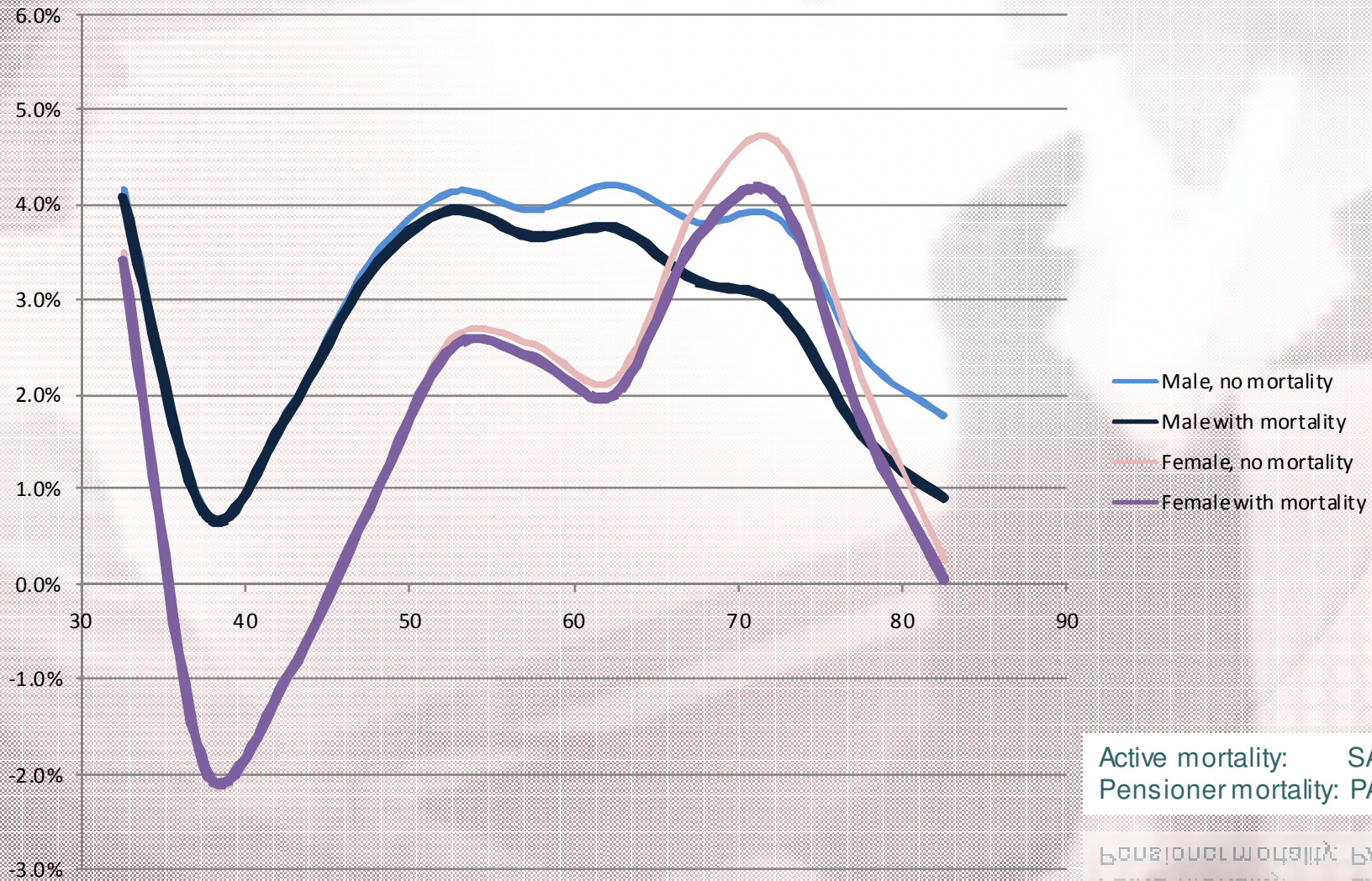
Active mortality: SA 85-90
Pensioner mortality: PA90 (-1)

Model structure

- Cash-flow projection
- Inflation
  - Contributions
  - Claims
  - Non-health
  - Investment return
- Child dependant withdrawal
  - Or conversion to principal member
- Mortality
- Lapses
- New entrants

New entrant model

- "Fold-back" of existing population onto itself

- Constant addition of new beneficiaries

- Scheme's starting profile subject to a maximum age

- Leads to a stationary population
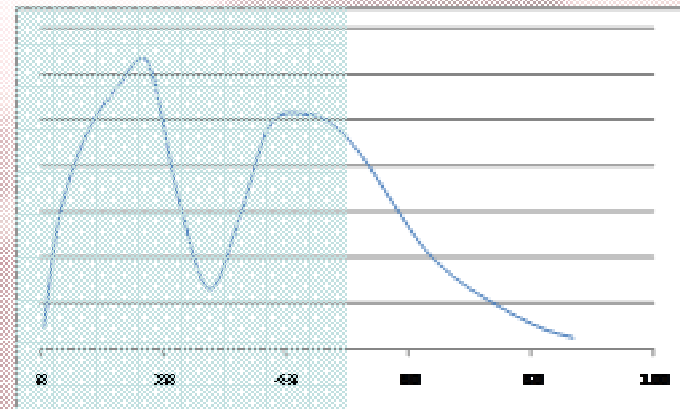
Assumptions

- Long-term inflation   6.0%
- Investment return   8.5%
- Claims inflation   8.0%
  (Inflation + margin for technology, HIV/AIDS, PMB-creep)
- Non-health inflation   6.0%

- Contribution increases   8.0%
  Allows us to assess whether *ageing* can be funded from future contributions
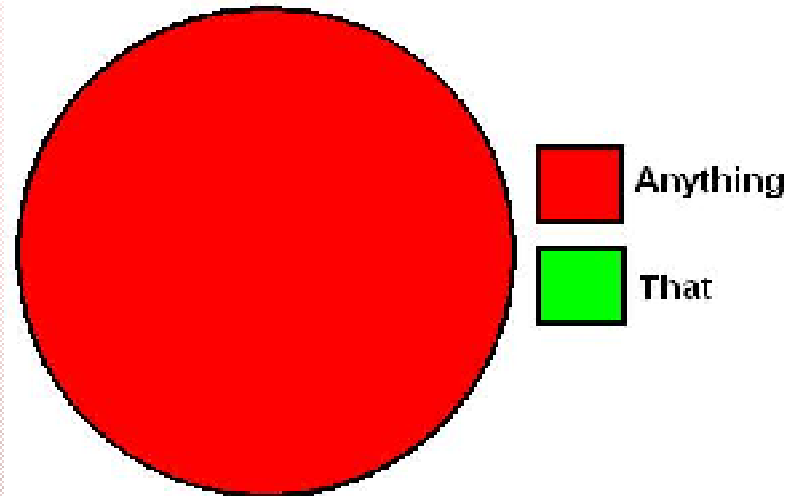
Assumptions

- Active mortality   SA 85-90 (-3 for females)
- Pensioner mortality   PA 90 (-1)

- Child dependents convert to principal members
  - Restricted schemes: 0%
  - Commercial schemes: 10%

- Lapse rate   0%

Case studies

Things Meat Loaf would do for love

Anything | That

Medical scheme scenarios

Scheme A

Ageing restricted scheme

Loss-making

Traditional benefits

Beneficiaries	15,512
MSA%	0.0%
Start avg age	43.53
Pensioner ratio	14.9%

Contribution table

Principal	1,729
Adult	1,399
Child	227

Income statement in year 0		pbpm	%ctr
Gross contributions	223,153,510	1,198.82	
Net contributions	223,153,510	1,198.82	
Claims	213,692,361	1,147.99	95.8%
Gross result	**9,461,149**	**50.83**	4.2%
Expenses	19,133,367	102.79	8.6%
Net result	**-9,672,219**	**-51.96**	**-4.3%**
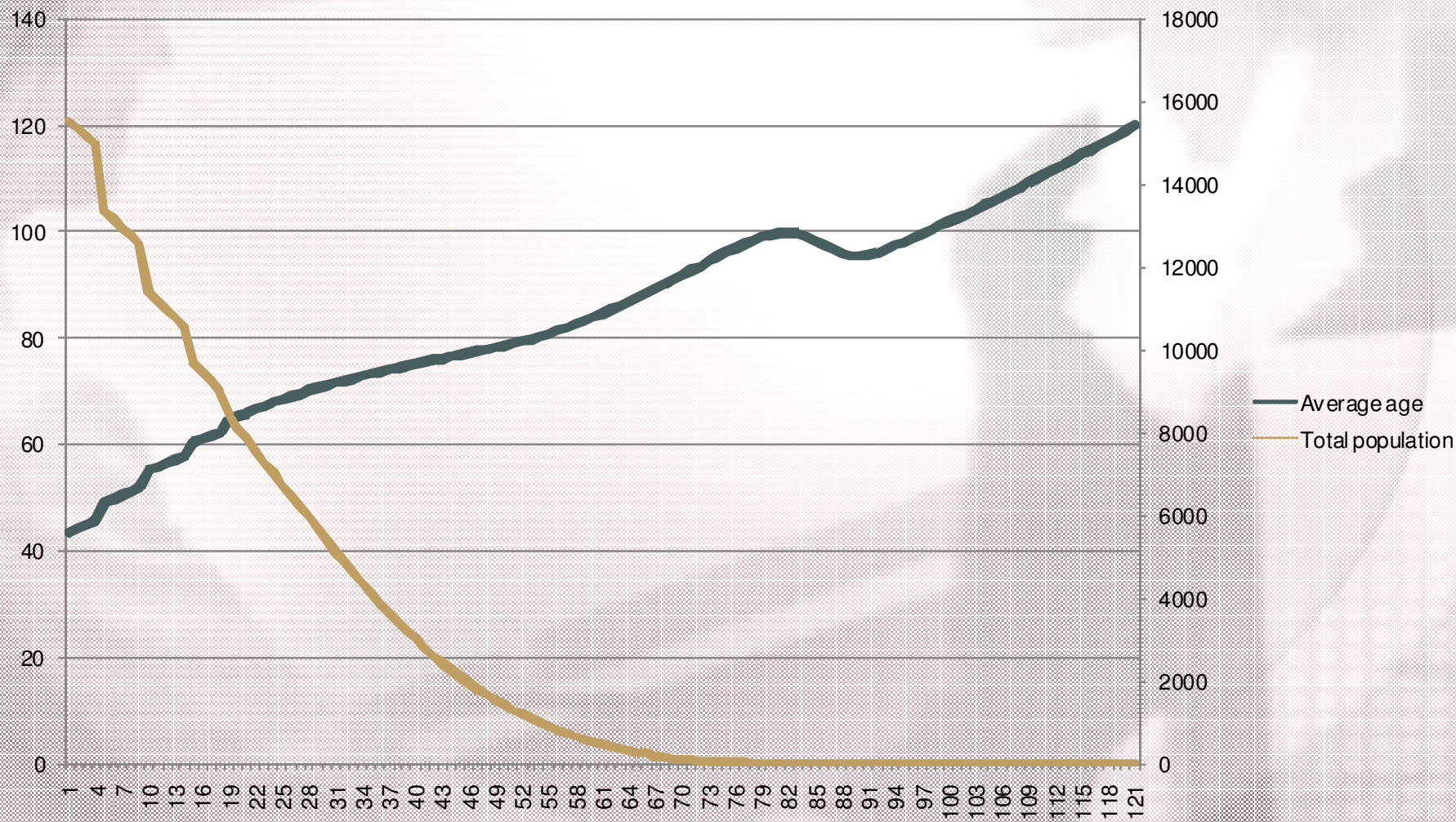
Scheme A

Nominal cash flows - existing population only

Legend:
- Contribs
- Claims
- Expenses
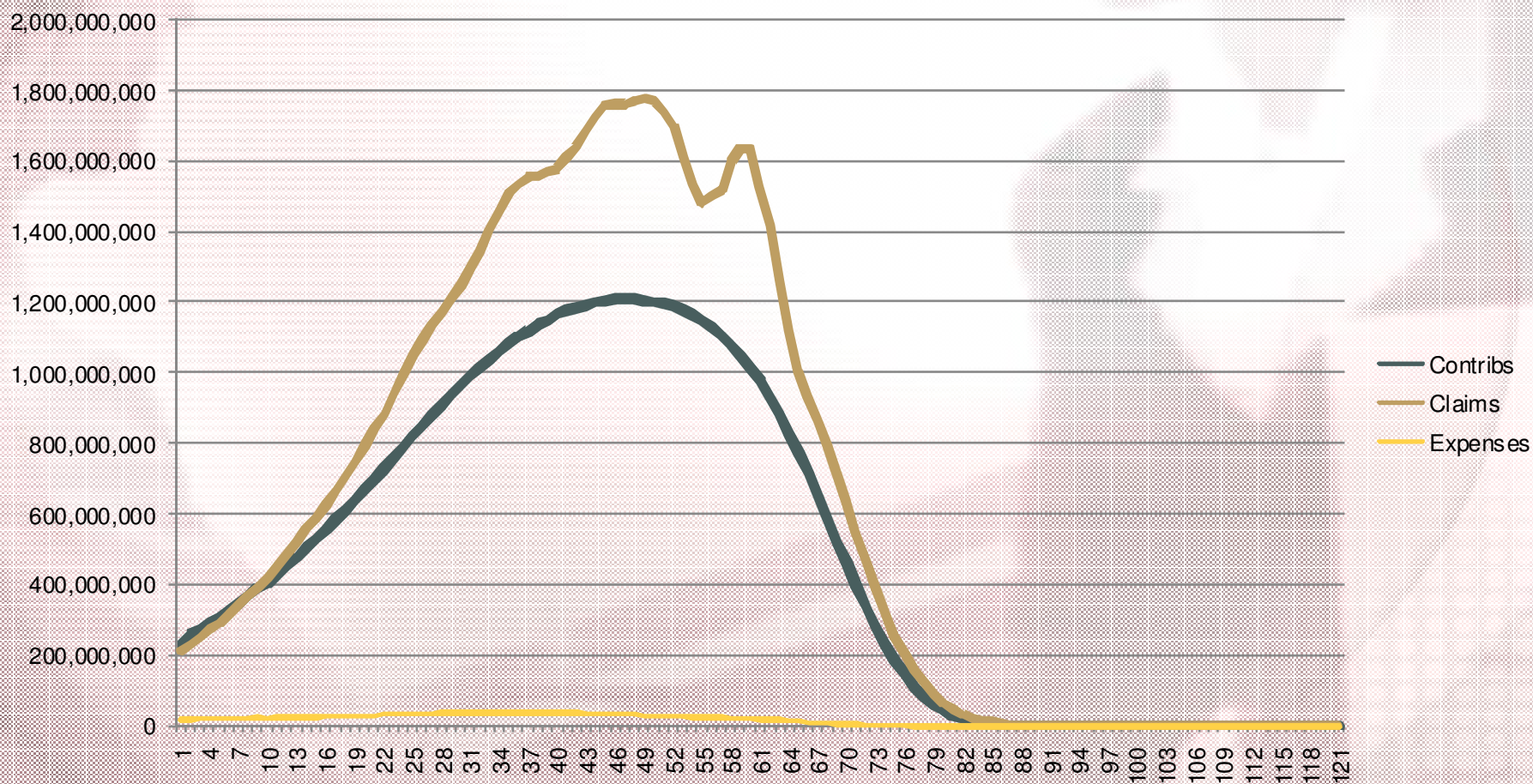
Scheme A

PV of cashflows - existing only
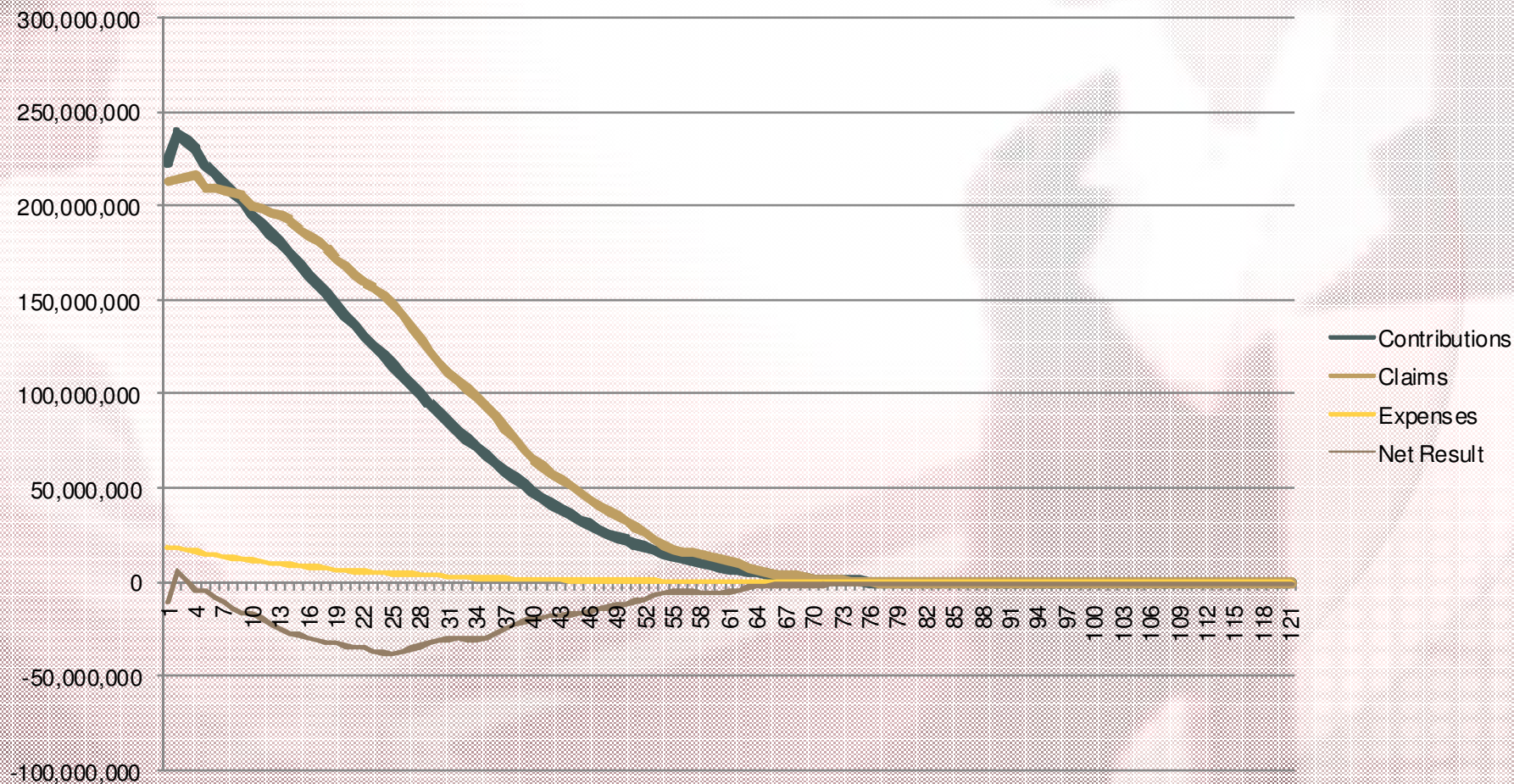
Scheme A

|	**Existing mbrs**
PV Contributions	6,151,735,007
PV Claims	7,009,608,424
PV Gross Result	**-857,873,417**
PV Expenses	322,695,773
PV Net Result	**-1,180,569,190**
Per existing beneficiary	
PV Contributions	396,579
PV Claims	451,883
PV Gross Result	**-55,304**
PV Expenses	20,803
PV Net Result	**-76,107**
Reserve requirement	
As a % gross ctr	**529%**

Scheme A

Reserve development in today's money terms (zero-end)
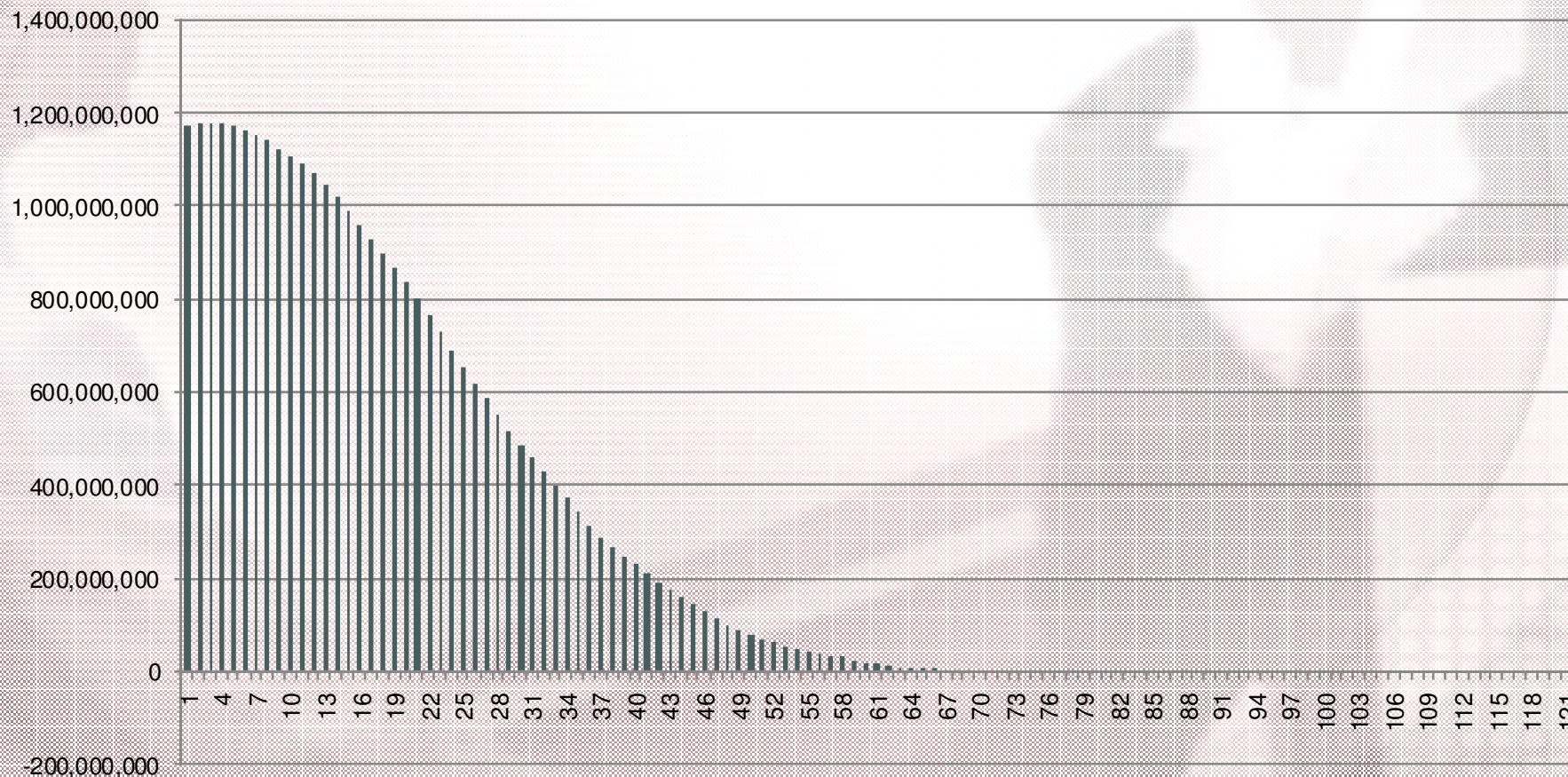
Scheme A

(How) can scheme A be made sustainable?

Scheme A

- Higher initial contributions
  (*i.e.* Start off in a surplus-making position)
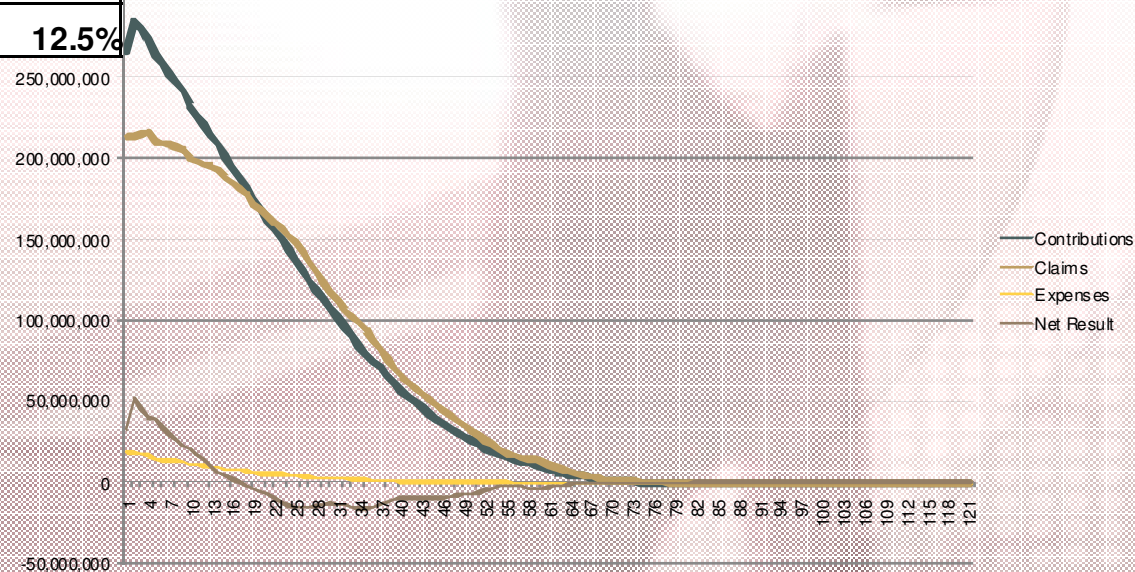- Higher annual contribution increase
- New entrants

Scheme A

Increase initial contributions by 20%

Income statement in year 0		pbpm	%ctr
Gross contributions	265,978,527	1,428.89	
Net contributions	265,978,527	1,428.89	
Claims	213,692,361	1,147.99	80.3%
Gross result	**52,286,166**	**280.89**	19.7%
Expenses	19,133,367	102.79	7.2%
Net result	**33,152,799**	**178.10**	**12.5%**

PV of cashflows - existing only

Legend: Contributions, Claims, Expenses, Net Result
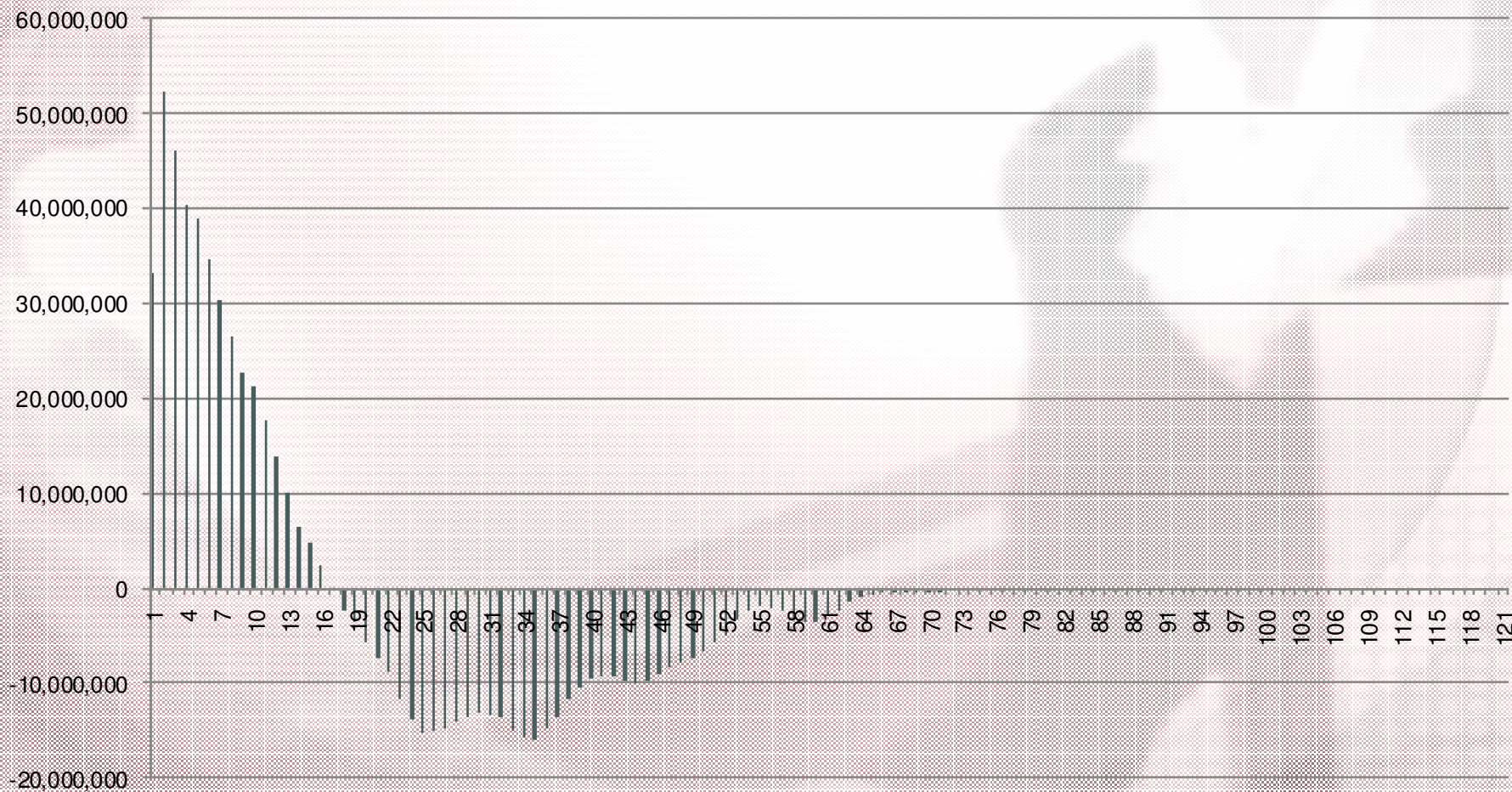
Scheme A
Initial contributions increased by 20%

Net Underwriting Results in today's money terms
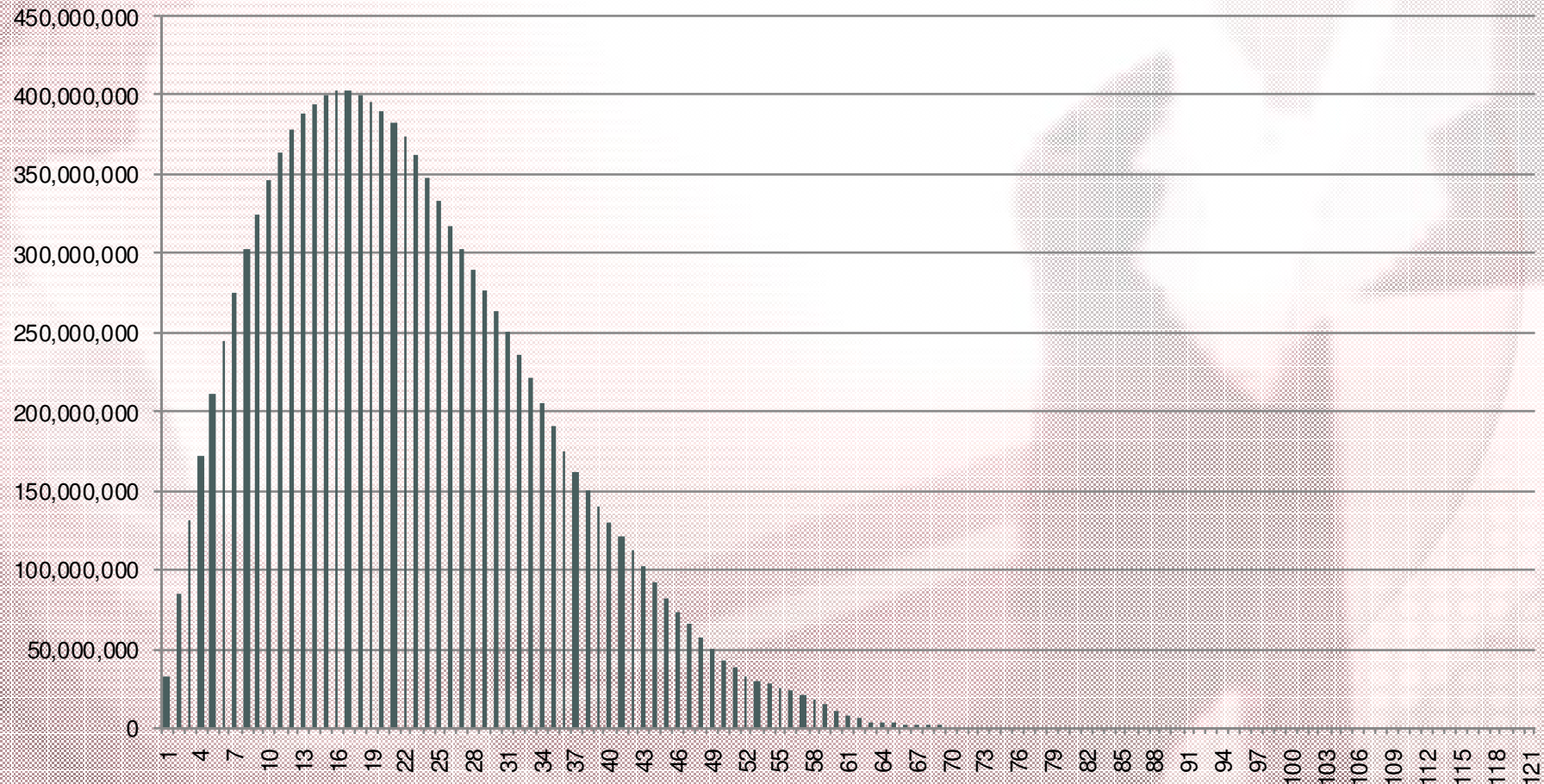
Scheme A
Initial contributions increased by 20%

Zero-based reserves in today's money terms

Scheme A

- Higher initial contributions
  (*i.e.* Start off in a surplus-making position)
- **Higher annual contribution increase**
- New entrants

Scheme A
Higher annual contribution increase

- Investment return   8.5%
- Claims inflation   8.0%
- Non-health inflation   6.0%

- Contribution increases

	8.00%	8.50%	9.00%
Cross-subsidiy liability	-1,180,569,190	-649,041,291	-42,891,229
per beneficiary	-76,107	-41,841	-2,765
Solvency ratio req'd	529%	291%	19%

Scheme A
Higher annual contribution increase
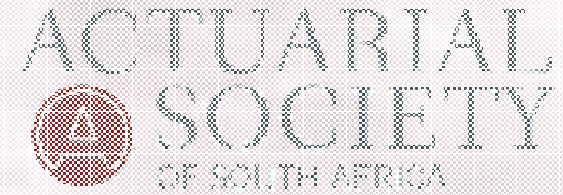
Net Underwriting Results in today's money terms

Scheme A
Higher annual contribution increase

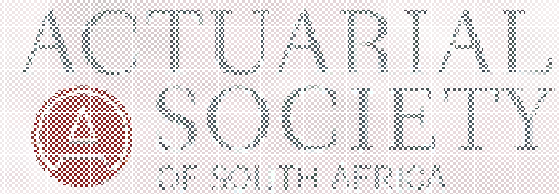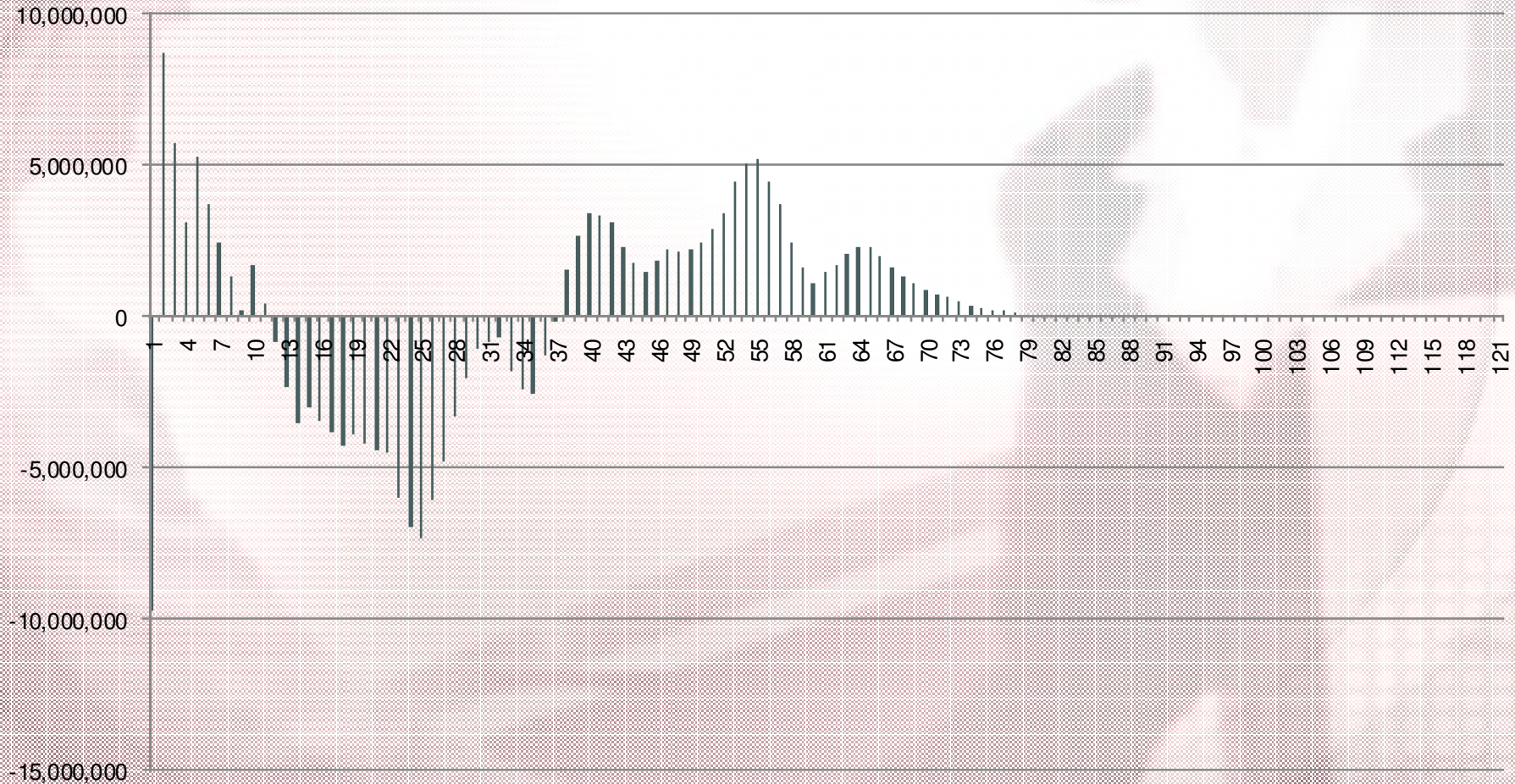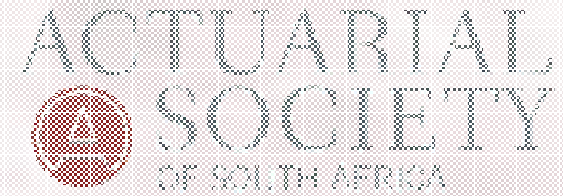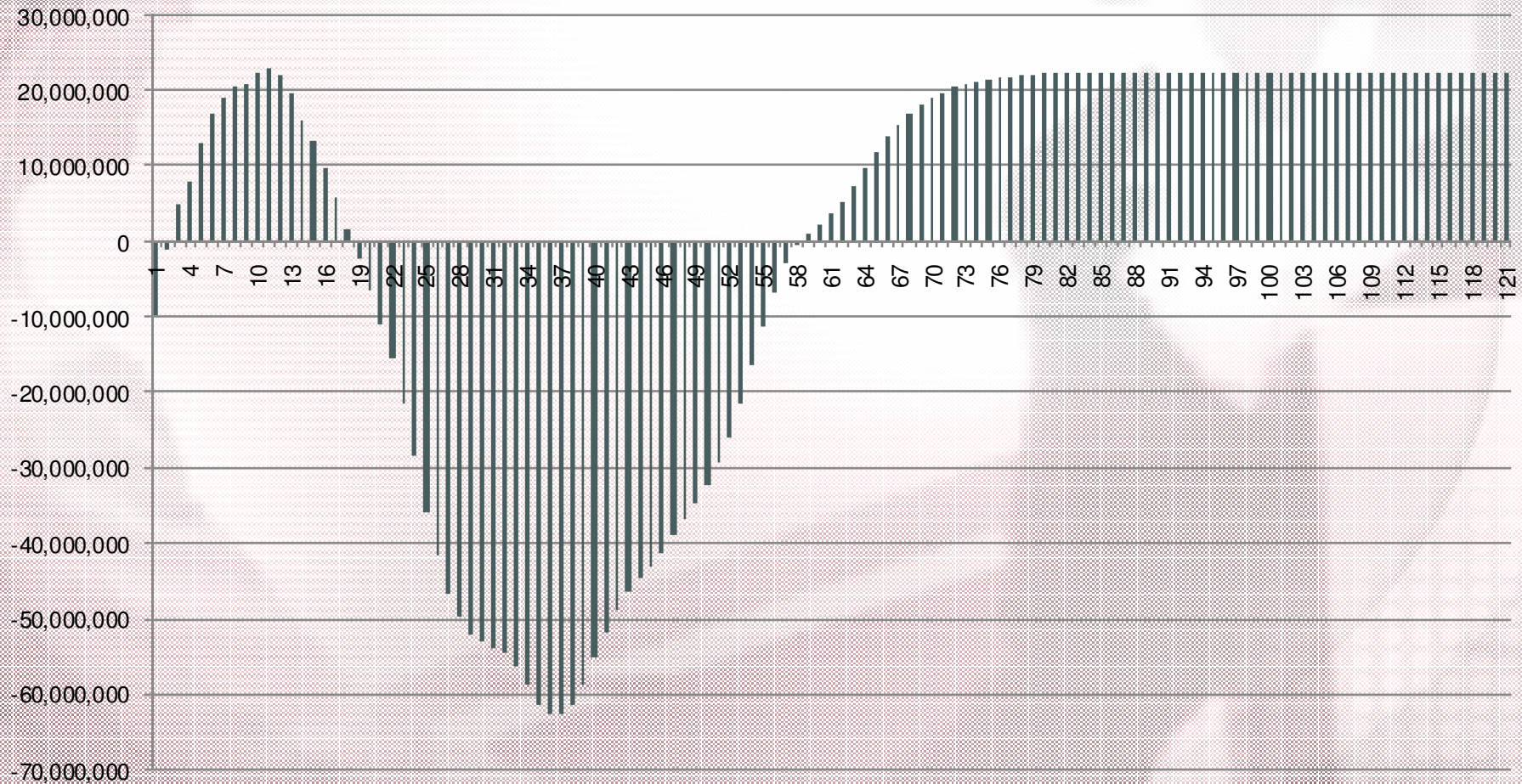Zero-based reserves in today's money terms

Scheme A

- Higher initial contributions
    (*i.e.* Start off in a surplus-making position)
- Higher annual contribution increase
- **New entrants**

Scheme A

Add new entrants
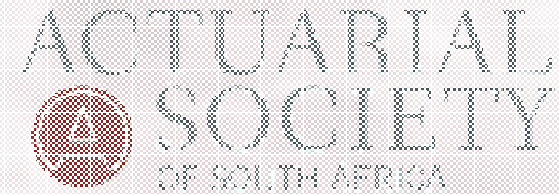
- ○ Requires simple growth rate of 2.6%

  (402 beneficiaries per year)

- ○ With a NE average age of 22.4 years

	Existing	New Entrants	Total
PV Contributions	6,151,735,007	12,272,135,423	18,423,870,430
PV Claims	7,009,608,424	10,760,611,072	17,770,219,496
PV Gross Result	**-857,873,417**	**1,511,524,351**	**653,650,934**
PV Expenses	322,695,773	328,591,239	651,287,012
PV Net Result	**-1,180,569,190**	**1,182,933,112**	**2,363,922**

Scheme A
Add new entrants

Net Underwriting Results in today's money terms
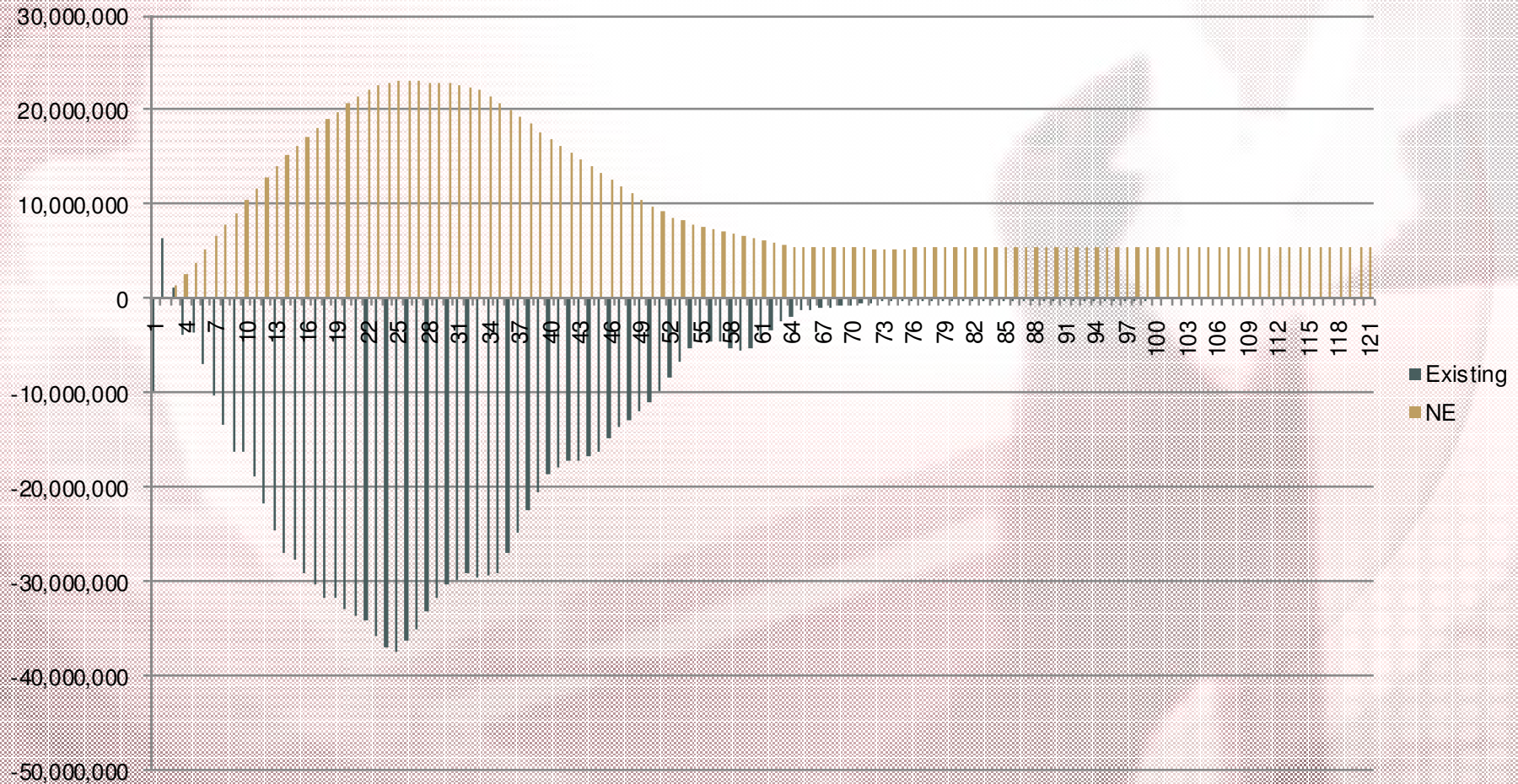
Scheme A
Add new entrants

Zero-based reserves in today's money terms
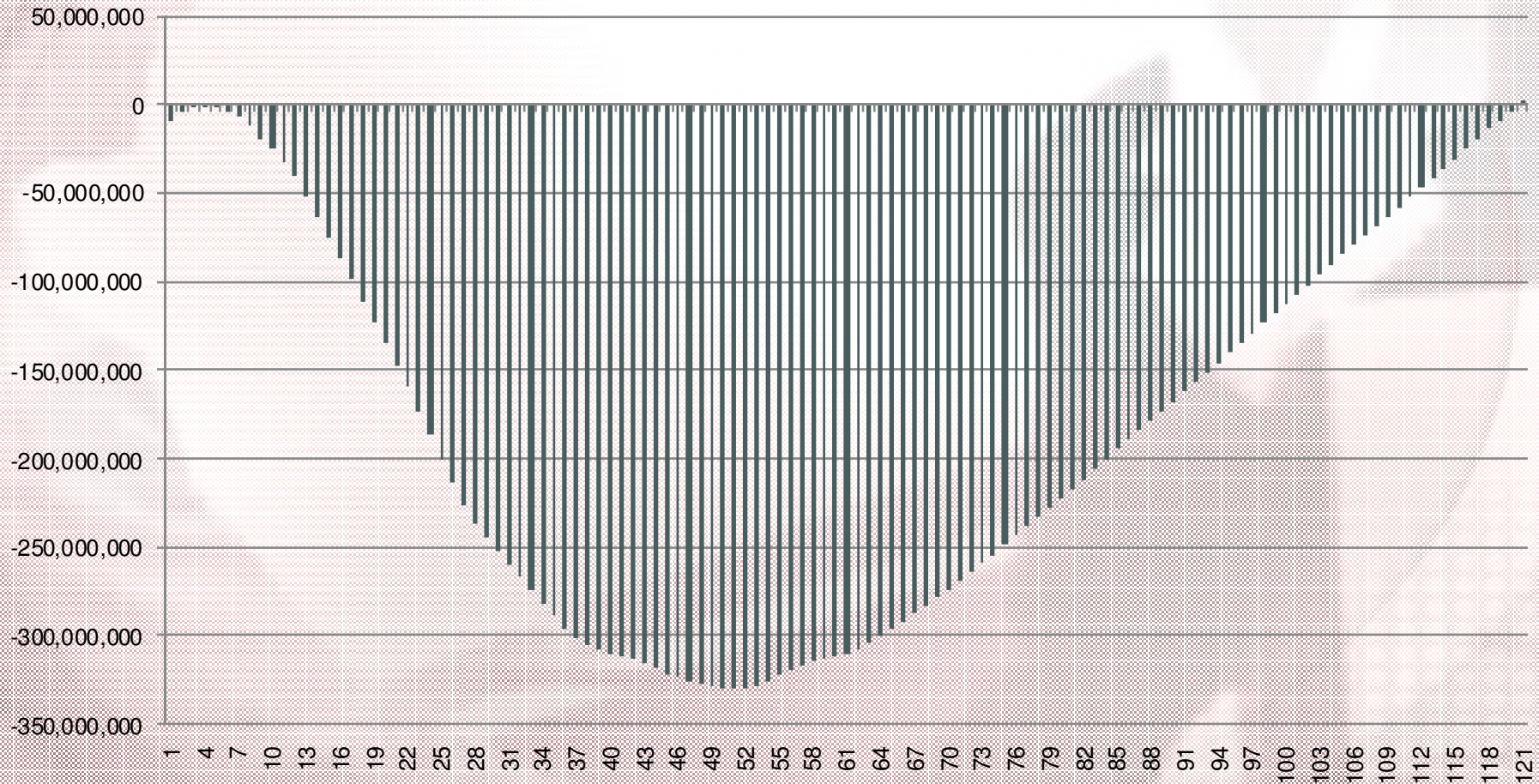
Scheme A
Add (more) new entrants
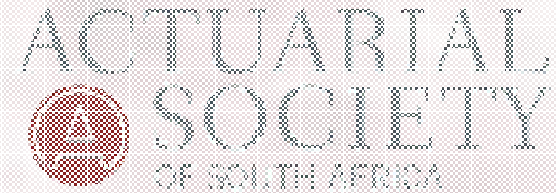
- Increase simple growth rate from 2.6% to 4.3%

  (671 beneficiaries per year)

- With a NE average age of 22.4 years

	Existing	New Entrants	Total
PV Contributions	6,151,735,007	20,453,559,039	26,605,294,046
PV Claims	7,009,608,424	17,934,351,787	24,943,960,211
PV Gross Result	**-857,873,417**	**2,519,207,252**	**1,661,333,835**
PV Expenses	322,695,773	547,652,065	870,347,838
PV Net Result	**-1,180,569,190**	**1,971,555,187**	**790,985,997**

Scheme A
Add (more) new entrants

Population (beneficiaries)

Scheme A

Can be made sustainable if

- Starting contributions are increased by 20%
- AND contributions are increased by claims inflation (excl ageing) every year thereafter, despite the generation of significant surpluses

OR

- If annual contribution increases exceed claims inflation (excl ageing) by 0.5%
- ...which implies a net discount rate of 0%

OR

- Adding new 4.3% new entrants with an average age of 22.4 years every year

Scheme B

Scheme B
Young commercial option
Surplus-making
Hospital plan with a small MSA

Beneficiaries	4,361
MSA%	10.0%
Start avg age	28.02
Pensioner ratio	1.6%

Contribution table

Principal	558
Adult	434
Child	209

Income statement in year 0		pbpm	%ctr
Gross contributions	24,484,375	467.87	
Net contributions	22,035,938	421.08	
Claims	10,050,569	192.05	45.6%
Gross result	**11,985,369**	**229.03**	54.4%
Expenses	9,373,453	179.12	42.5%
Net result	**2,611,916**	**49.91**	**11.9%**

Scheme B

PV of cashflows - existing only

Legend:
- Contributions
- Claims
- Expenses
- Net Result
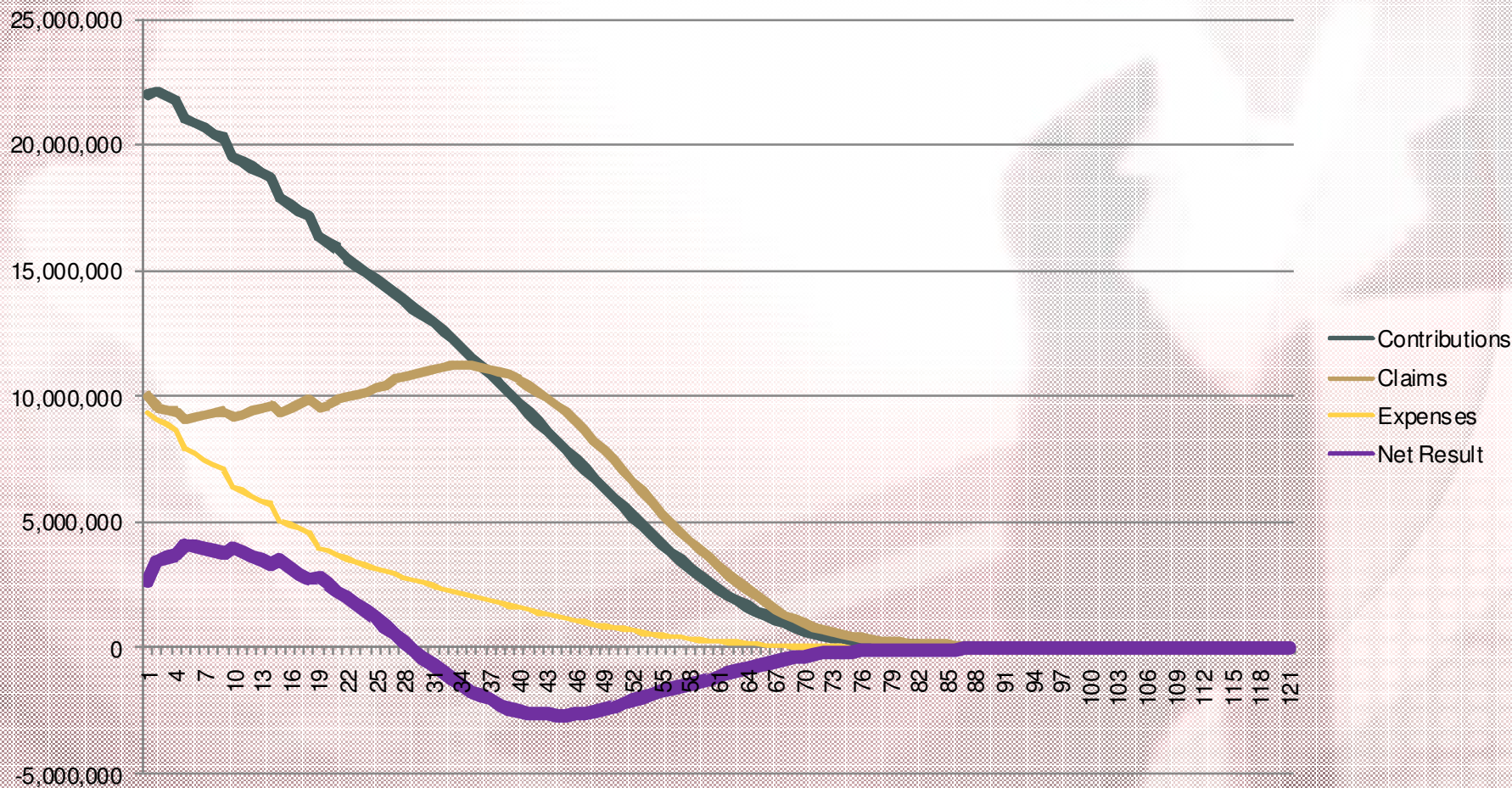
Scheme B

PV Contributions	784,373,715
PV Claims	573,454,373
PV Gross Result	**210,919,342**
PV Expenses	200,645,424
PV Net Result	**10,273,918**

Per existing beneficiary

PV Contributions	179,861
PV Claims	131,496
PV Gross Result	**48,365**
PV Expenses	46,009
PV Net Result	**2,356**

Reserve requirement
As a % gross ctr   **-42%**

Scheme C

Scheme C
Commercial scheme
Older profile
Hospital plan

Beneficiaries	12,853
MSA%	0.0%
Start avg age	41.90
Pensioner ratio	16.6%

Contribution table

Principal	706
Adult	606
Child	389

Income statement in year 0		pbpm	%ctr
Gross contributions	92,676,913	600.88	
Net contributions	92,676,913	600.88	
Claims	88,984,888	576.94	96.0%
Gross result	**3,692,026**	**23.94**	4.0%
Expenses	18,848,880	122.21	20.3%
Net result	**-15,156,854**	**-98.27**	**-16.4%**

Scheme C

Scheme C
Commercial scheme
Older profile
Hospital plan

Beneficiaries	12,853
MSA%	0.0%
Start avg age	41.90
Pensioner ratio	16.6%

Contribution table

Principal	706
Adult	606
Child	389

Income statement in year 0		pbpm	%ctr
Gross contributions	92,676,913	600.88	
Net contributions	92,676,913	600.88	
Claims	88,984,888	576.94	96.0%
Gross result	**3,692,026**	**23.94**	4.0%
Expenses	18,848,880	122.21	20.3%
Net result	**-15,156,854**	**-98.27**	**-16.4%**

	Existing
PV Contributions	2,449,995,944
PV Claims	3,594,260,477
PV Gross Result	**-1,144,264,533**
PV Expenses	346,345,505
PV Net Result	**-1,490,610,038**

Per existing beneficiary	**Existing**
PV Contributions	190,617
PV Claims	279,644
PV Gross Result	**-89,027**
PV Expenses	26,947
PV Net Result	**-115,974**

Reserve requirement	
As a % gross ctr	**1608%**

Scheme D
Historically targeted at government employees

Scheme D
Commercial scheme
Historically targeted at GEMS members

Beneficiaries	37,270
MSA%	22.0%
Start avg age	30.13
Pensioner ratio	1.3%

Contribution table

Principal	1,004
Adult	707
Child	212

Income statement in year 0		pbpm	%ctr
Gross contributions	326,518,114	730.07	
Net contributions	254,684,129	569.46	
Claims	163,942,181	366.56	64.4%
Gross result	**90,741,948**	**202.89**	35.6%
Expenses	63,467,712	141.91	24.9%
Net result	**27,274,236**	**60.98**	**10.7%**

Scheme D
Historically targeted at government employees

Scheme D
Commercial scheme
Historically targeted at GEMS members

Beneficiaries	37,270		
MSA%	22.0%		
Start avg age	30.13		
Pensioner ratio	1.3%		

Contribution table

Principal	1,004
Adult	707
Child	212

Income statement in year 0		pbpm	%ctr
Gross contributions	326,518,114	730.07	
Net contributions	254,684,129	569.46	
Claims	163,942,181	366.56	64.4%
Gross result	**90,741,948**	**202.89**	35.6%
Expenses	63,467,712	141.91	24.9%
Net result	**27,274,236**	**60.98**	**10.7%**

PV Contributions	8,607,399,489
PV Claims	9,667,644,063
PV Gross Result	**-1,060,244,574**
PV Expenses	1,126,683,417
PV Net Result	**-2,186,927,992**

Per existing beneficiary

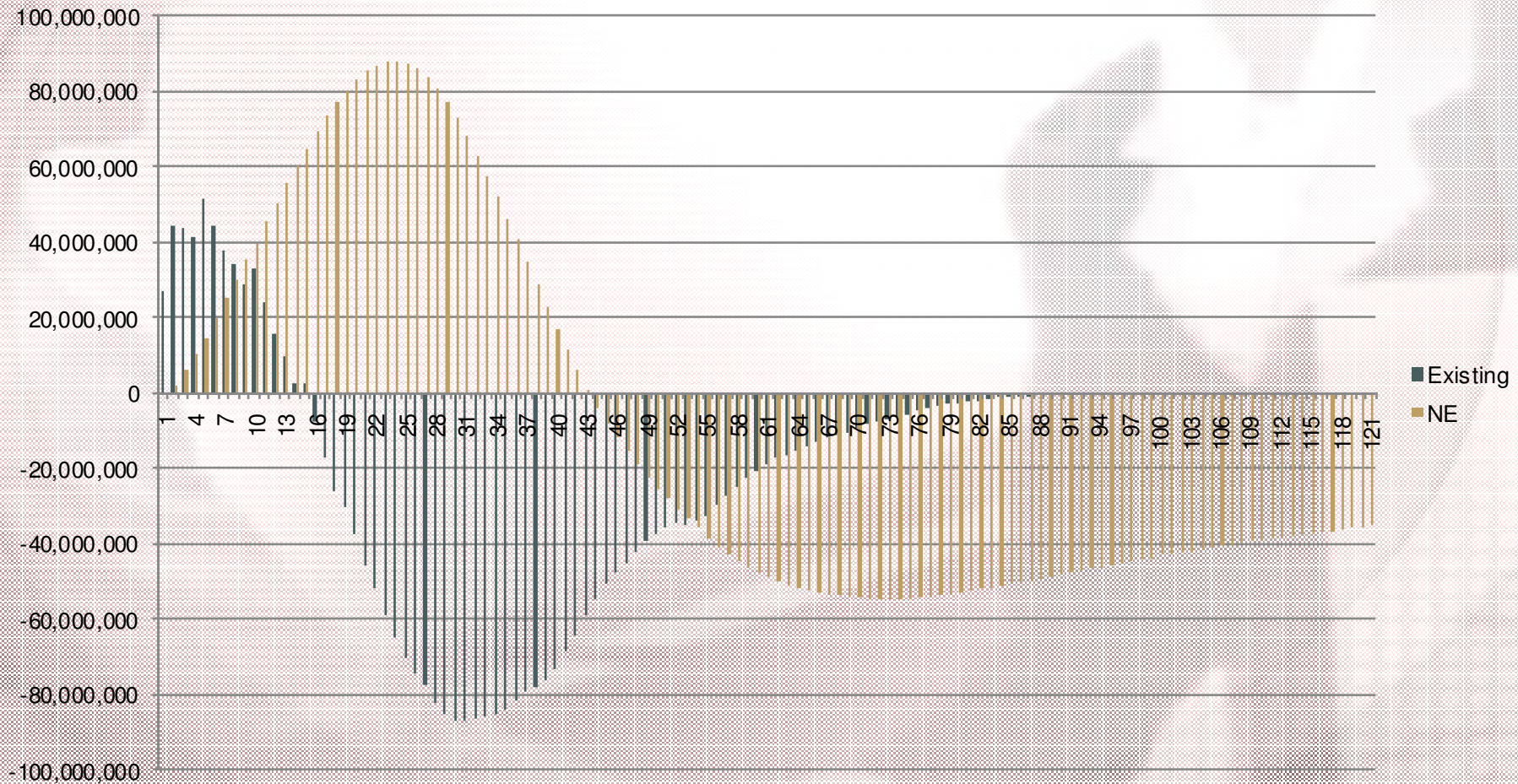|	
PV Contributions	230,947
PV Claims	259,395
PV Gross Result	**-28,448**
PV Expenses	30,230
PV Net Result	**-58,678**

Reserve requirement

As a % gross ctr	**670%**

Scheme D
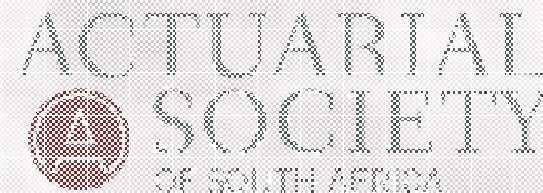Historically targeted at government employees

Net Underwriting Results in today's money terms

Existing
NE
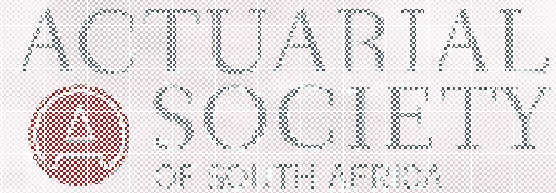
Scheme E
The industry

- Cross-subsidy liability of the entire industry?

- Crudely modelled on CMS 2007-2008 annual report

- No new entrants

- Self-funding requirement: annual contribution increases of 8.8%
  - *i.e.* 0.8% higher than claims inflation (net of ageing)
  - or   0.3% higher than investment return

Case-study observations
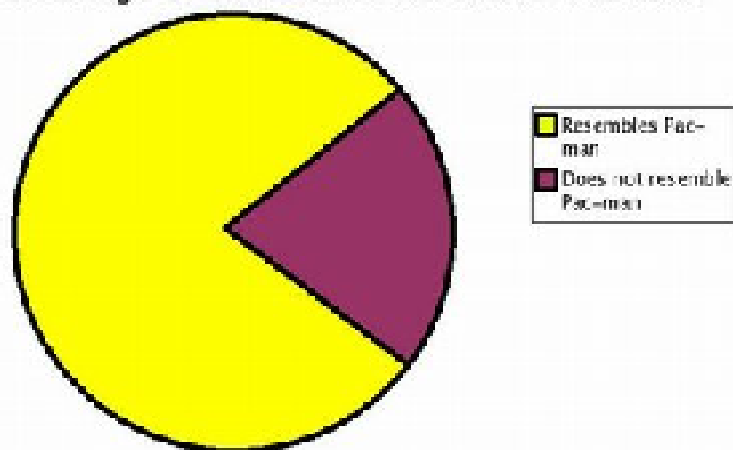
Key observations

1. Some schemes can (theoretically) be self-funding in the long term

2. Schemes presently making surpluses of 10-15% of contributions can self-fund with (relative) ease

3. Sensitive to differential between contribution increases and claims inflation

4. Several break-even schemes' cross-subsidy liabilities exceed R50000 to R100000 per beneficiary

   Translating into current solvency margin requirements in excess of 500%

5. Child dependant conversion into principal member can have a significant impact, depending on contribution structure

6. The number of young and healthy new entrants required to turn loss-making schemes around is usually unrealistic

   Re-introducing the "missing" 20-30 year-old demographic could change this

7. Young new entrants is a viable strategy for sustainability
   ...but is unlikely to effect a turnaround for an already-failing scheme

Inflationary assumptions

- Long-term inflation
6.0%
- Investment return
8.5%
- Claims inflation
8.0%

    (Inflation + margin for technology, HIV/AIDS, PMB-creep)

- Non-health inflation
6.0%

- Contribution increases
8.0%, 8.5%, 9.0%
- Implied net risk discount rate
0.5%, 0.0%, -0.5%

Valuation bases

- The level of the net discount rate assumed in a valuation implies whether new entrants are expected to enter the system going forward

- Contribution increases   8.0%, 8.5%, 9.0%
- Implied net risk discount rate   0.5%, 0.0%, -0.5%

Valuation bases

What is an appropriate net discount rate to use for a scheme that does not expect new entrants?

Valuation bases

- Risk discount rates typically positive
  - With 2% being regarded as aggressive
  - And 0% as being conservative

- Restricted schemes with little or no new entrants may require lower (even negative) net discount rates

- Realistic to assume annual increases in excess of (salary) inflation in the long term?
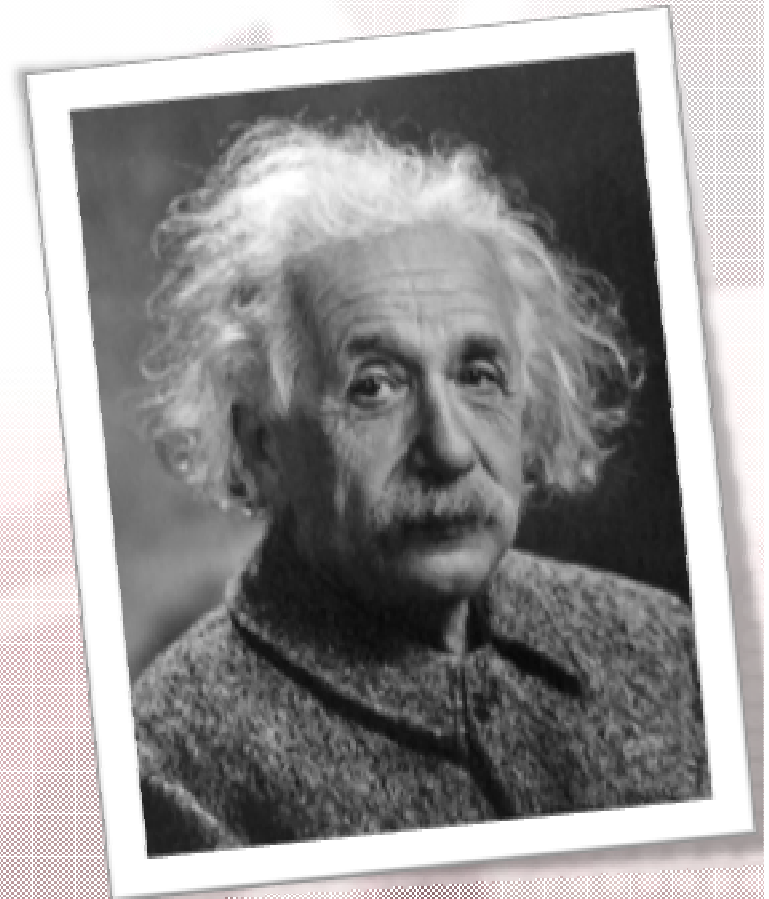
Regulatory intervention

- Risk equalisation
  - Flattens the claims curve
  - Reduces the absolute value of cross-subsidy liabilities
  - At the cost of contribution increases to some lower-income schemes

- Income cross-subsidies

- Mandatory participation

"A happy man is too satisfied with the present to dwell too much on the future"

- Albert Einstein, 1896

2009 Convention Lite and the Pensions, Health and Life Seminars

19-20 May 2009

Sandton Convention Centre Johannesburg, South Africa