



*Santiago, 29jan15*

# **Risk equalization in practice experiences from Europe and the US**

*Seminar 3 organized by  
the Asociación de ISAPREs*

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# Agenda

1. Risk equalization in 5 European countries;
2. Risk equalization in the US;
3. Different payment flows
4. How good are current RE-models?
5. Is selection a problem?
6. How to further improve RE?
7. Implementation issues
8. Political issues concerning RE.
9. Lessons learned after 25 years.



# *1. RE in five European countries*

From the mid-1990s citizens in Belgium, Germany, Israel, the Netherlands and Switzerland have a guaranteed periodic choice among risk-bearing social health insurers, which are responsible for purchasing their care or providing them with medical care.



# *The practice of RE & risk-sharing in 5 countries*

	Belgium	Germany	Israel	Netherlands	Switzerland
<b>Risk-adjusters</b>	age/gender region disability unemployment mortality	age/gender disability	Age	age/gender region disability	age/gender region
<b>Risk-sharing</b>	Proportional risk-sharing, at least 85%	no	Severe diseases (6 percent of expenses)	outlier risk- sharing & Proportional Risk-sharing	no
<b>Open enrollment every month/.../year</b>	quarter	year	half year	year	half year
<b>Year of implementation</b>	1995	1994 4	1995	1991	1993

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# *Implementation problems*

- Implementation of RE in practice: very complex!
- Lack of data at individual level;
- Lack of data for health adjustment;
- Appropriate incentives: often not used as a relevant criterion.



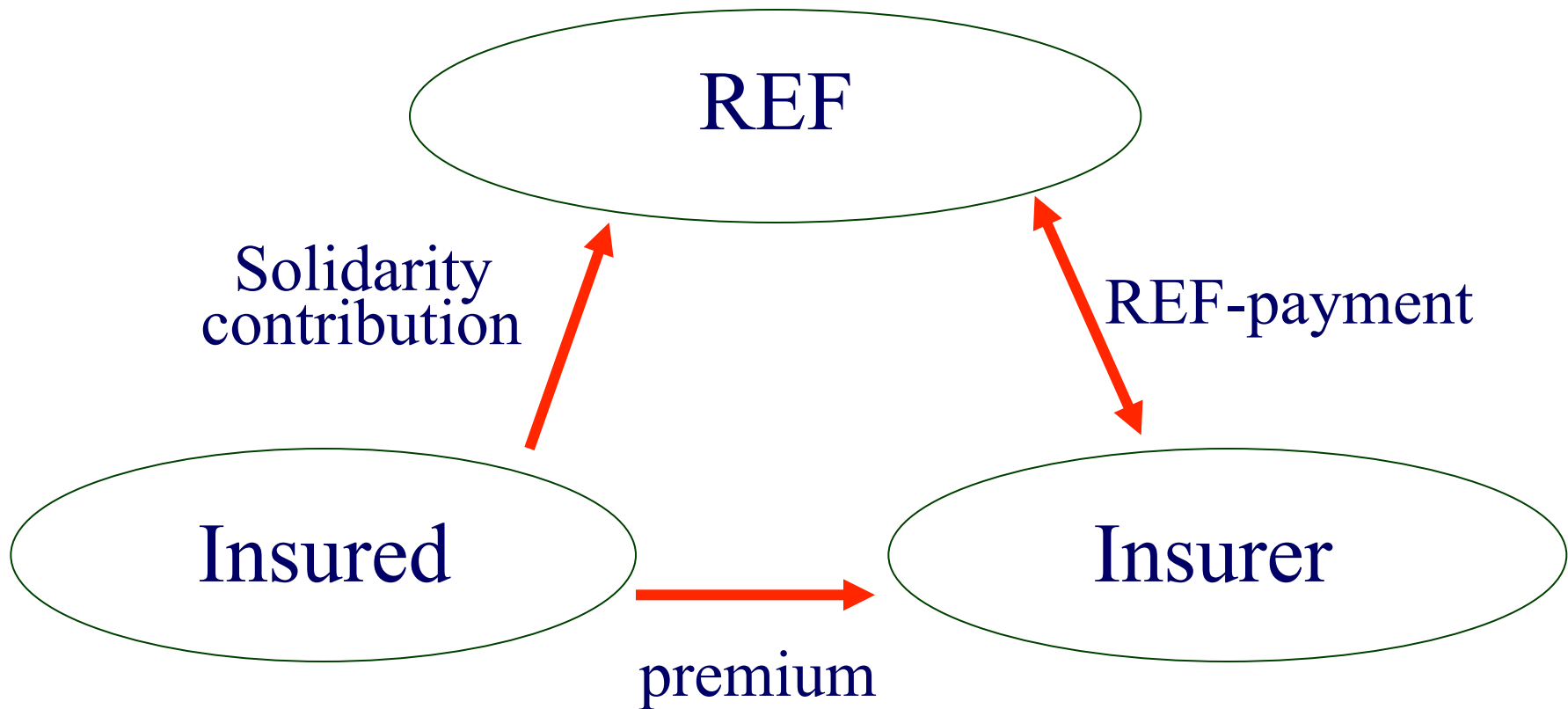
# ***Risk Equalization in 2006***

	<b>Belgium</b>	<b>Germany</b>	<b>Israel</b>	<b>Netherlands</b>	<b>Switzerland</b>
<b>Risk adjusters</b>	<b>Age/gender, Disability, Invalidity, Chronic illness, Mortality, Employment status, Social status, Income, Urbanization.</b>	<b>Age/gender, Disability, Registration in a certified Disease Management Programme, Entitlement for sick leave payments, Income.</b>	<b>Age.</b>	<b>Age/gender, Disability, Pharmacy-based Cost Groups, Diagnostic Cost Groups, Self-employed, Urbanization.</b>	<b>Age/gender, Region.</b>
<b>Quality of RE</b>	<b>Moderate / fair</b>	<b>Moderate</b>	<b>Low</b>	<b>Fair / good</b>	<b>Low</b>



# *Risk Equalization Fund (REF)*

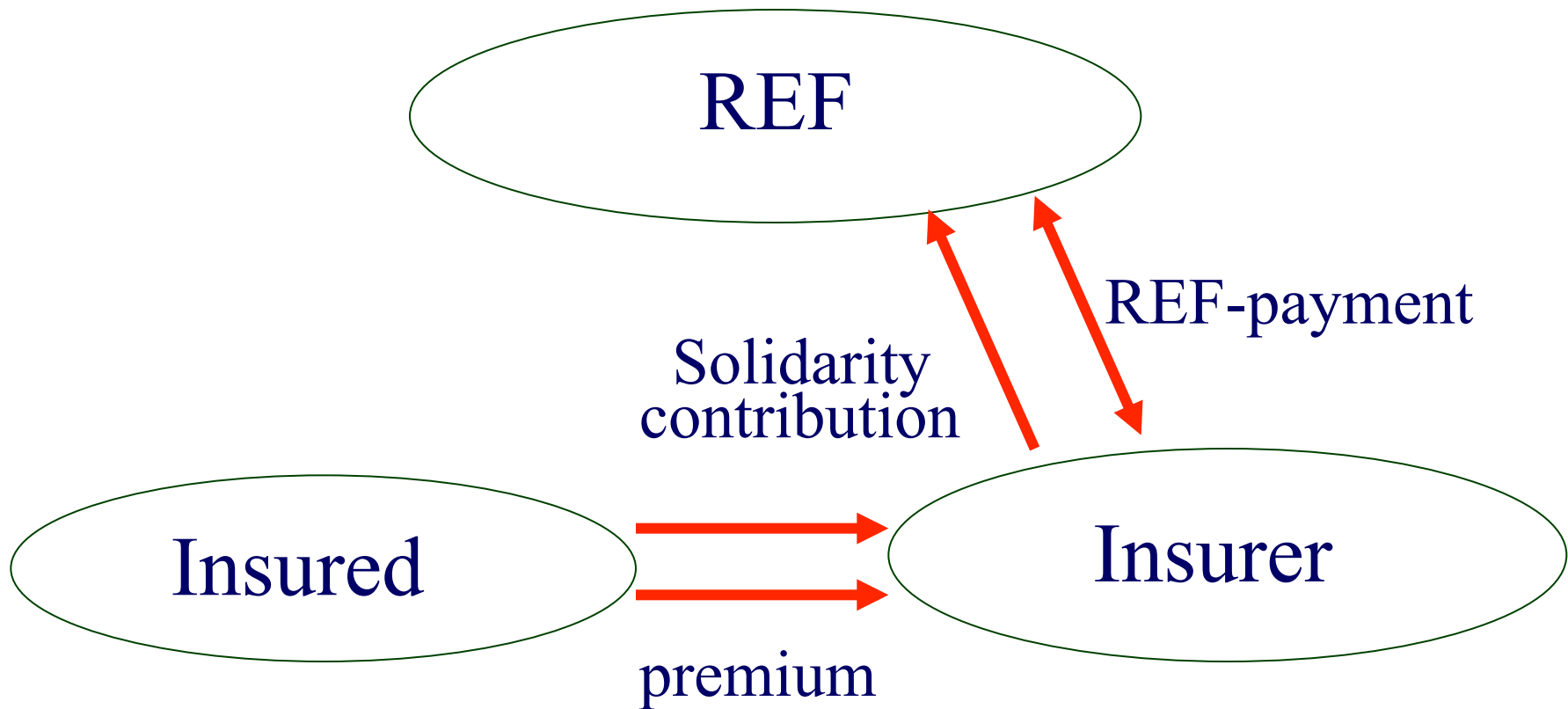
**Belgium, Israel, the Netherlands:**





# *Risk Equalization Fund (REF)*

**Germany, Switzerland:**







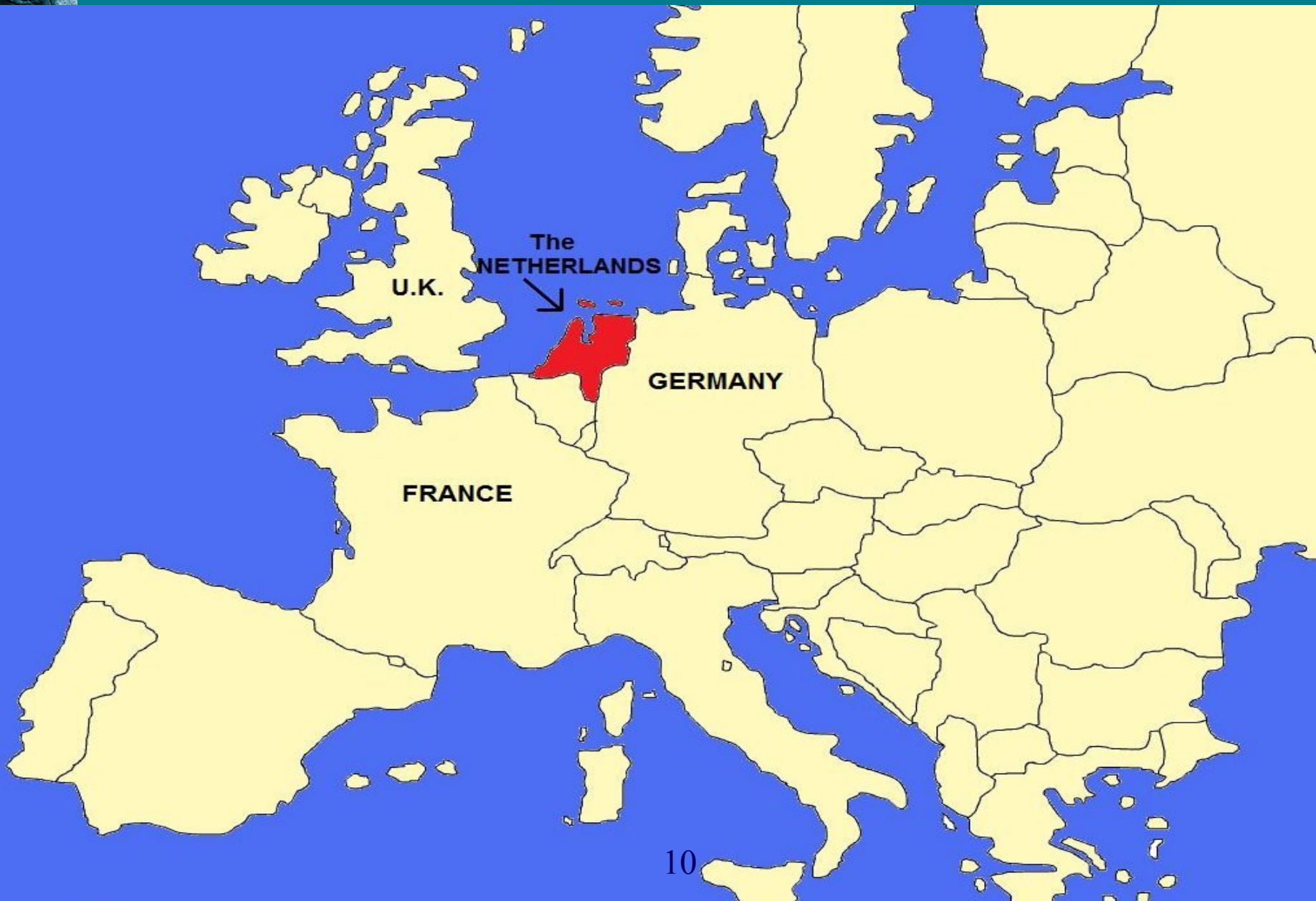
# *Premium rate restrictions*

To make health insurance affordable government in each of the 5 countries imposed restrictions on the variation of the premium contributions, together with open enrolment requirement.

Given insufficient risk equalization these restrictions create incentives for selection.



# *The Netherlands*





# *Risk adjusters in the Dutch REF*

<i>Year</i>	<i><b>New</b> risk adjuster</i>
1992	Age/gender
1995	Region, yes/no employee, disability
1997	Age/disability
2002	Pharmacy-based Cost Groups (PCGs) (13 PCGs and about 7% of population)
2004	Diagnostic Cost Groups (DCGs) (2% pop) yes/no self-employed
2007	Multiple PCGs allowed (co-morbidity); (20 PCGs and about 16% of population)
2008	Indicator of Socio-Economic Status



# *Risk adjusters in the Dutch REF*

<i>Year</i>	<i>New risk adjuster</i>
2012	Multi-prior-year high expenses (MHE); 2 new PCGs;
2013	outpatient-based DCGs, i.e. diagnostic information not only from prior hospitalization, but also from other prior medical encounters with a medical specialist.
2014	Cost groups based on the prior use of medical devices (MDCG)
2015	Interaction term between age (65+) and DCG, PCG and MHE.

Risk equalization, excl. costs for mental health care



# *PCGs and DCGs*

- **Pharmacy Costs Groups (PCGs):**  
A morbidity measure based on information about chronic conditions deduced from the use of outpatient prescribed drugs.
- **Diagnostic Cost Groups (DCGs):**  
A morbidity measure based on information about the diseases diagnosed during previous hospitalizations and (from 2013) other prior medical encounters.



# *Indication of additional annual premium subsidy for individuals classified in PCGs*

Risk Group		Additional annual premium subsidy (in €)
<b>PCG 0</b>	<b>Reference group</b>	<b>0</b>
<b>1</b>	<b>Asthma / COPD</b>	<b>876</b>
<b>2</b>	<b>Epilepsy</b>	<b>1051</b>
<b>3</b>	<b>Rheumatism</b>	<b>1176</b>
<b>4</b>	<b>Heart diseases</b>	<b>1495</b>
<b>5</b>	<b>Crohn's disease/ c. ulcerosa</b>	<b>1538</b>
<b>6</b>	<b>Stomach diseases</b>	<b>1932</b>
<b>7</b>	<b>Diabetes (insuline dependent)</b>	<b>2807</b>
<b>8</b>	<b>Parkinson</b>	<b>2653</b>
<b>9</b>	<b>Organ transplants</b>	<b>4363</b>
<b>10</b>	<b>Cancer</b>	<b>4796</b>
<b>11</b>	<b>Cystic fibrosis</b>	<b>5382</b>
<b>12</b>	<b>HIV / AIDS</b>	<b>11455</b>
<b>13</b>	<b>Kidney problems</b>	<b>18225</b>





# *Indication of additional annual premium subsidy for individuals classified in DCGs*

<b>Risk Group</b>		<b>Additional annual premium subsidy (in €)</b>
<b>DCG 0</b>	<b>Reference group</b>	<b>0</b>
<b>7</b>	<b>Brain injury</b>	<b>1735</b>
<b>9</b>	<b>Colon cancer</b>	<b>2261</b>
<b>11</b>	<b>Liver disorders</b>	<b>3487</b>
<b>12</b>	<b>Rectal cancer</b>	<b>3636</b>
<b>13</b>	<b>Congestive heart failure</b>	<b>3578</b>
<b>14</b>	<b>Hypertension, complicated</b>	<b>4491</b>
<b>15</b>	<b>Neurologic disorders</b>	<b>5390</b>
<b>16</b>	<b>Brain / nervous system cancers</b>	<b>6165</b>
<b>19</b>	<b>Chemotherapy</b>	<b>7591</b>
<b>20</b>	<b>Diabetes with chronic complications</b>	<b>7288</b>
<b>21</b>	<b>Pulmonary fibrosis and brochiectasis</b>	<b>8603</b>
<b>22</b>	<b>HIV / AIDS</b>	<b>9780</b>
<b>23</b>	<b>Renal failure / nephritis</b>	<b>24020</b>



## 2. *Risk equalization in the US*

- Medicare
- Affordable Care Act (ACA)  
(‘Obamacare’ & ‘Health Insurance Exchanges’)





# *Medicare in the US*

- Medicare enrollees (65+) have a choice between the traditional FFS-Medicare and Medicare Advantage (MA) plan (e.g. an HMO);
- RE only for MA plans;
- RE-payments for MA-enrollees are based on the costs of Medicare enrollees (65+) in the traditional FFS-Medicare.



# *Medicare in the US*

- Due to risk selection MA-enrollees are healthier than Medicare enrollees (65+) in the traditional FFS-Medicare.
- Therefore the average RE-payments for MA-enrollees are  $X\%$  ( $< 100\%$ ) of the average expenses in the traditional FFS-Medicare. Otherwise Medicare would make substantial losses.  
How to determine  $X$  ??



# *RE in Medicare in the US*

- Since 2000 the RE-payments for MA-enrollees are based on Diagnostic Cost Groups (DCGs);
- Currently the Hierarchical Condition Categories (HCC) RE formula: DCGs based on hierarchies, adjusting for comorbidity.
- Medicare does not cover prescription drugs, so RE-payments can not be based on PCGs.
- The RE-payments for MA-enrollees are not based on multiyear prior information.
- There are strong indications of substantial incentives for risk selection in the HCC-formula.



# *Affordable Care Act in the US*

- Affordable Care Act (ACA): ‘Obamacare’ & ‘Health Insurance Exchanges’;
- ACA-regulation: individual and ‘small group’ health insurance market;
- 2014: the first year of RE under ACA-regulation;
- Unknown who will choose an ‘regulated’ health insurance;



# *RE under ACA-regulation in the US*

- No prior information know, therefore: **retrospective** RE-model;
- All states (except MS) use the HCC-formula developed by the federal government (similar as in Medicare).
- In the period 2014-2016 the incentives for risk selection are mitigated by risk sharing ('reinsurance' and 'risk corridors')

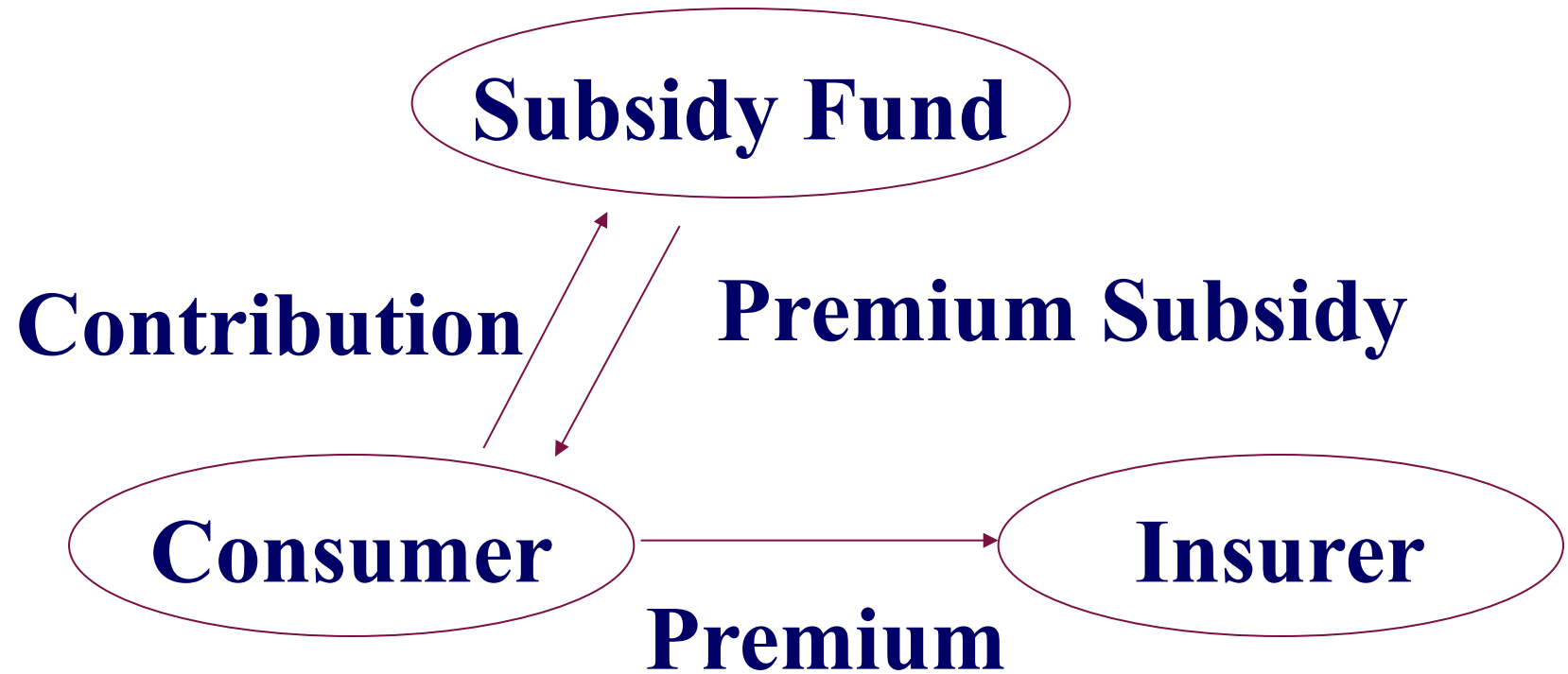


### 3. *Different payment flows*

- Tree modalities of payment flows.
- No country has chosen for Modality A;
- Modality B and C have been chosen equally.
- Some countries have a mixture of B and C.



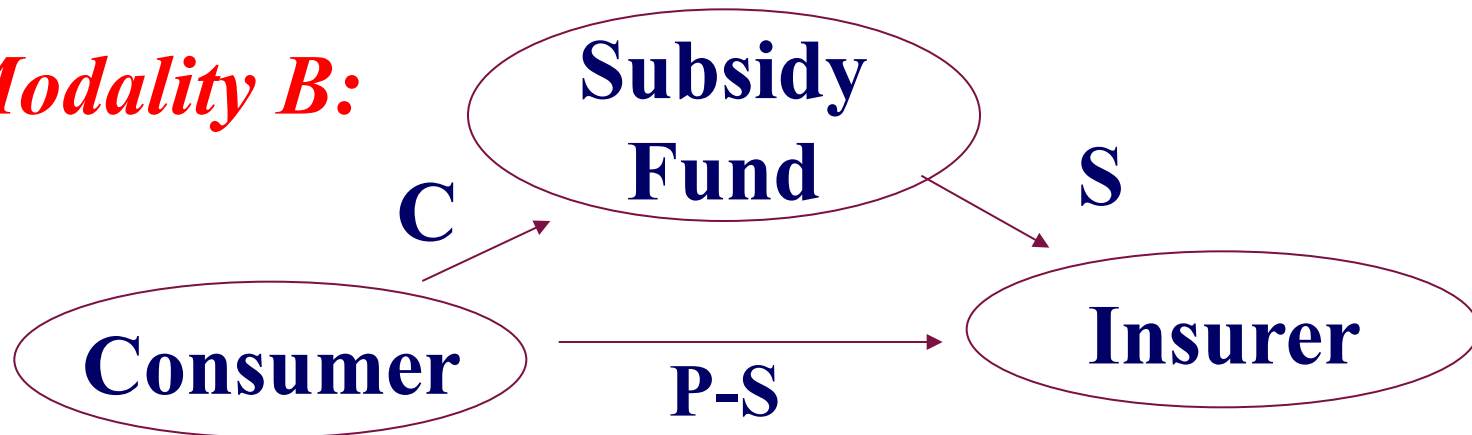
# *Premium subsidies (Modality A)*



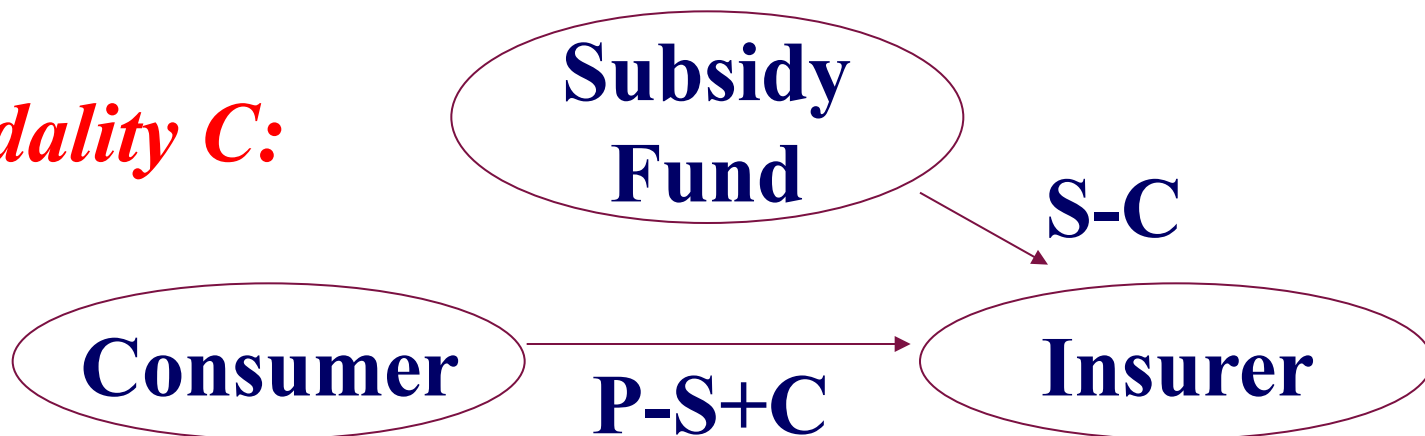


# Modalities of risk equalization

## *Modality B:*



## *Modality C:*



**C=Contribution; S=Subsidy; P=Premium**





# ...similar prediction formula

*Different modalities of RE...*

.... can use the *same* prediction formula:

**Risk-adjusted (ra) subsidy per individual =**

$$= \hat{y} - \alpha * \tilde{y}$$

**with  $\hat{y}$  = ra predicted expenses per individual,  
 $\tilde{y}$  = average expenses over all individuals.**

$\alpha = 0 \rightarrow$  Modality B (as in Israel and US-Medicare),

$\alpha = 1 \rightarrow$  Modality C (as in Switzerland and Ireland).

NB: in the Netherlands  $\alpha = 0.5$



# *Criteria organizing the payment flows*

1. Subsidies only for low-income people only? (not B or C);
2. Level of transaction costs (highest in A);
3. Income-related contribution (hard to realize in C);
4. Premium responsiveness of consumer (highest in B);



# *Criteria organizing the payment flows*

5. Chance of default of premium payment (lowest in B);
6. *Mandatory* contributions and *voluntary* insurance (Better not C);
7. Amount of money through the Subsidy Fund (lowest in C);
8. The insurers perception of ‘winner’ or ‘loser’ (highest in C).

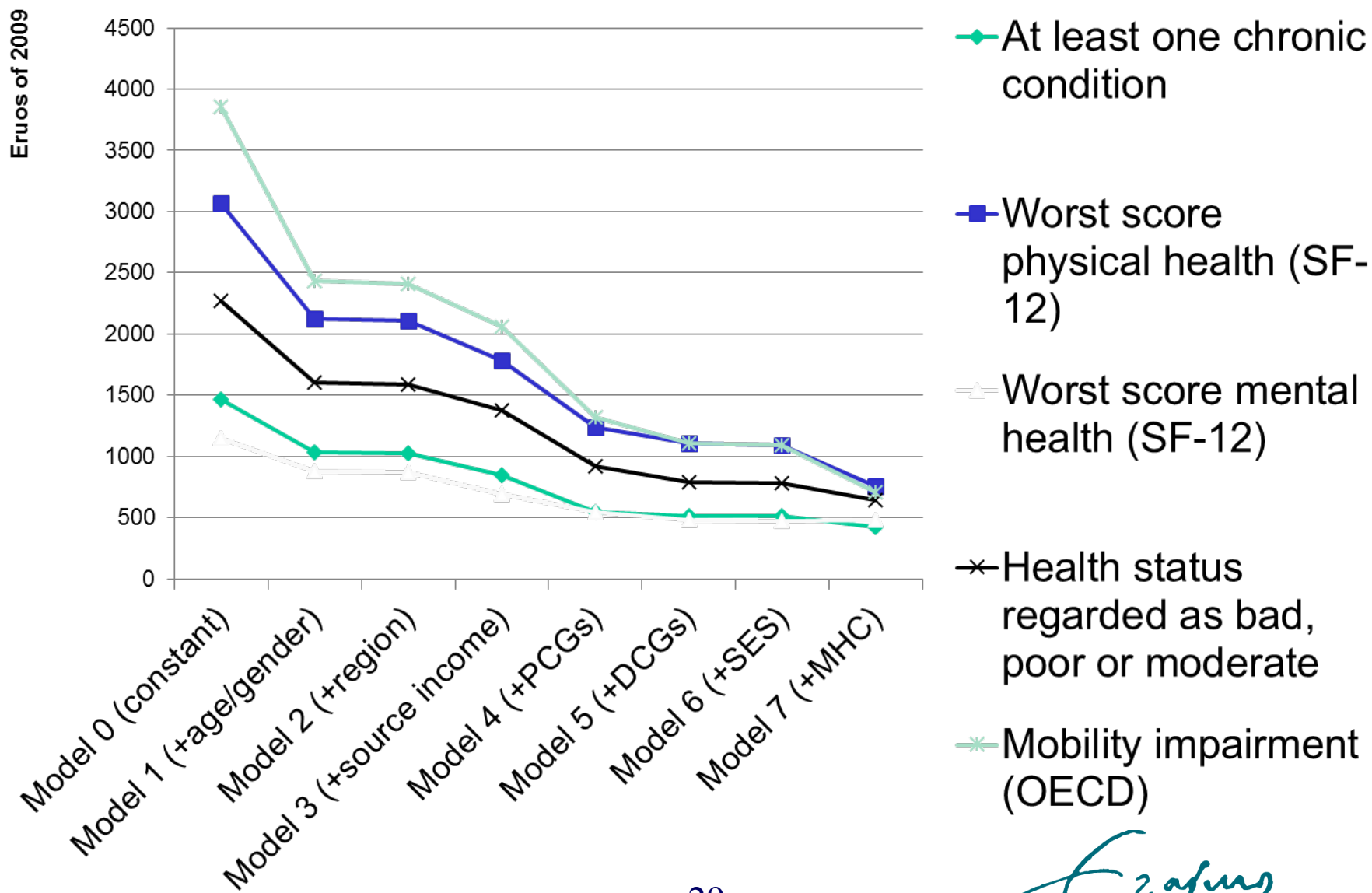


## 4. *How good are current RE-models?*

Model	Years (NL)	Description	R-squared * 100%
0	1991-1992	Constant (no risk adjusters)	0.00%
1	1993- 1994	Model 0 + 40 classes for age/gender	5.97%
2		Model 1 + 10 clusters for region	6.01%
3	1995- 2001	Model 2 + 17 classes for source of income	6.83%
4	2002-2003	Model 3 + 26 PCGs	15.92%
5	2004-2011	Model 4 + 14 DCGs	24.99%
6		Model 5 + 12 SES-classes	25.04%
7	2012-2013	Model 6 + 7 MHC-classes	29.61%



# *Undercompensation of subgroups based on information from year $t-1$ for 8 Dutch RE models*





# Results Dutch RE-formula (model 6)

Subgroup <b>based on prior info:</b> <b>year t-3</b>	Size	Costs in €	Average under- compensation
Self-reported health status fair/poor	21.2%	3404	541
Worst score Physical functioning (SF-36)	10.0%	4469	1140
Worst score Social functioning (SF-36)	10.0%	3190	649
Restricted in mobility (OECD-score)	14.9%	3740	653
Stroke, brain haemorrhage/ infarction	2.6%	4341	943
Myocardial infarction	3.3%	4755	789
Other serious heart disease	2.3%	4654	926
Some type of (malignant) cancer	4.8%	3440	689



# Results Dutch RE-formula (model 6)

Subgroup <b>based on prior info:</b> <b>year t-3</b>	Size	Costs in €	Average under- compensation
High bloodpressure	15.2%	2961	342
Astma, chronic bronchitis, emphysema	8.1%	3182	460
3-6 self-reported conditions	22.3%	2848	333
7 or more self-reported conditions	2.9%	4833	1461
Prescribed drugs (self reported, 2 weeks)	48.2%	2597	220
Contact specialist (self reported, 1 year)	39.8%	2586	317
Hospitalization (self reported, 1 year)	7.5%	3611	1034
Home care (self reported, 1 year)	2.2%	4258	1152



# Results Dutch RE-formula (model 6)

Subgroup <b>based on prior info: year t-3 through t-7</b>	Size	Costs in €	Average under-compensation
In top-25% highest costs, in 3 of 5 years	5.9%	2537	238
In top-25% highest costs, in 4 of 5 years	4.5%	3240	304
In top-25% highest costs, in 5 of 5 years	8.2%	6131	1757
Hospitalization in 2 of the 5 years	4.7%	3613	728
Hospitalization in 3 of the 5 years	1.1%	6606	2030
Hospitalization in 4 of the 5 years	0.3%	11763	5933
Hospitalization in 5 of the 5 years	0.1%	14373	6453

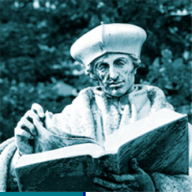
Source: Stam and Van de Ven, 2008  
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# 5. *Is selection a problem?* (2006)

	Belgium	Germany	Israel	Netherlands	Switzerland
<b>Quality of Risk Equalization</b>	Moderate / fair	Moderate	Low	Fair / good	Low
<b>Financial risk insurers</b>	7.5%	96%	94%	53%	100%
<b>Number of health insurers</b>	6	275	4	33	93
<b>Is selection a problem?</b>	increasing	YES	increasing	increasing	YES



# *Risk sharing in Europe ( 2006)*

	Belgium	Germany	Israel	Netherlands	Switzerland
<b>Financial risk sponsor /REF</b>	<b>92.5%</b>	<b>4%</b>	<b>6%</b>	<b>47%</b>	<b>0%</b>
<b>Financial risk insurers</b>	<b>7.5%</b>	<b>96%</b>	<b>94%</b>	<b>53%</b>	<b>100%</b>

- In **Israel**: informal ex-post compensations to the health plans;
- In **Belgium, Germany and Switzerland**: health plans pay only a part of the hospitals expenses.



# *Why risk sharing in NL?*

## **1. Imperfections in the RE-formula**

- an incentive for risk selection;
- no level playing field for the insurers;

## **2. Government regulation with e.g. prices and capacity**

- Insurers can not be held responsible for high expenses

## **3. Imperfections of next year's predicted macro-budget to be allocated to the insurers**



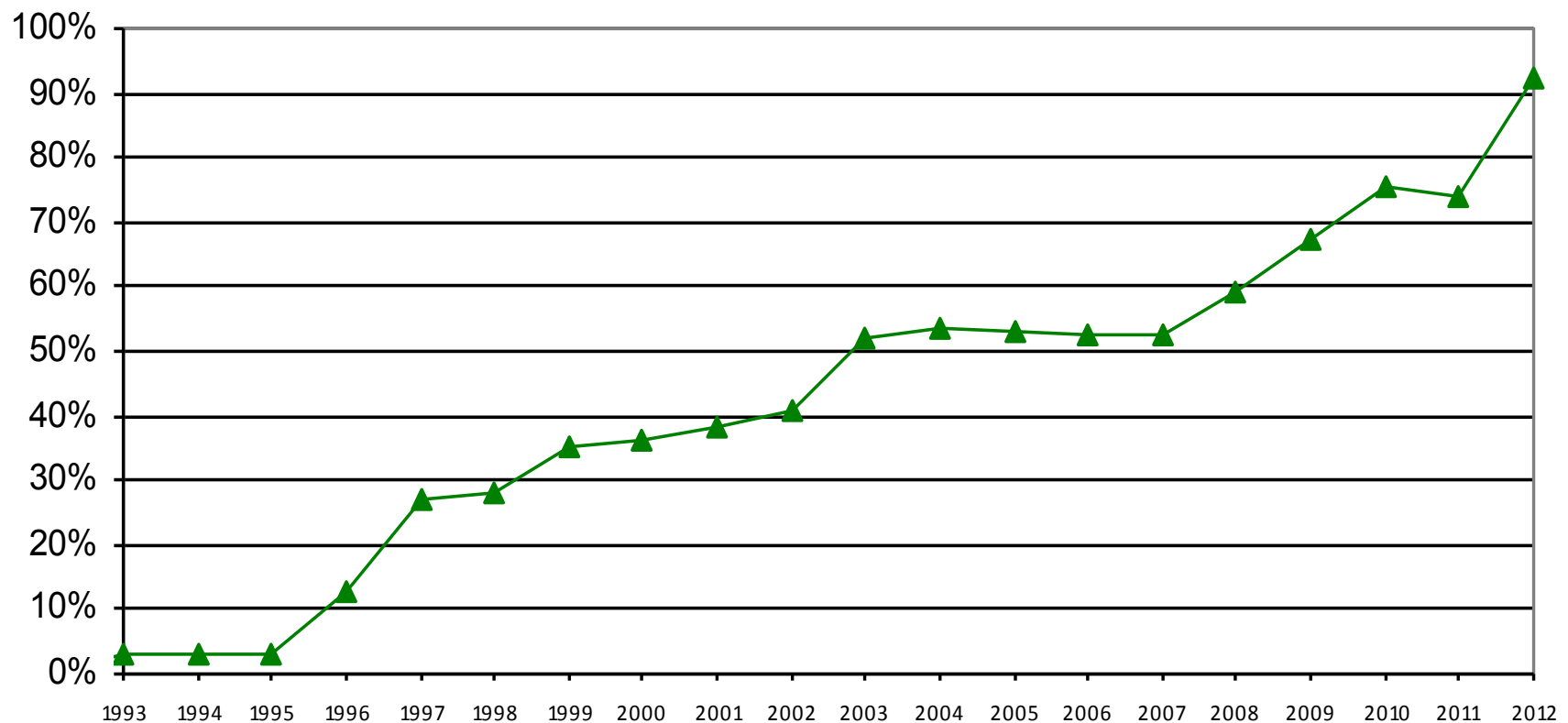
# *Forms of risk sharing and risk pooling*

- **Excess loss sharing:** a percentage of each consumer's annual expenses above a threshold (e.g. 20,000 euro) is reimbursed
- **Mandatory mutual pooling:** a percentage of each insurer's annual profit or loss must be pooled among the insurers
- **Proportional profit/loss-sharing:** a percentage of each insurer's annual profit/loss is shared with the risk equalization fund
- **Outlier-profit/loss-sharing:** each insurer's annual profit/loss outside a bandwidth is shared with the risk equalization fund
- **Macrobudget-compensation**



# *Risk sharing in the Netherlands 1993-2012*

**Gemiddeld financieel risico van zorgverzekeraars (exclusief  
macronacalculatie en bandbreedteregeling)**





# *Selection activities*

- selective contracting;
- limited provider plans (HMOs/PPOs);
- other managed care techniques;
- design of benefits package;
- supplementary health insurance;
- virtual (internet) health insurer;
- (employer-related) group contracts;
- software to distinguish high- and low-risk applicants during phone-calls;
- Bonusses for risk-selecting insurance agents;
- ...., ....., ..... .



# *Adverse effects of risk selection*

1. A disincentive to be responsive to the preferences of high-risk consumers;  
→ selection may **threaten good quality care** for the chronically ill;
2. Risk selection is more attractive than improving efficiency;  
→ selection may **threaten efficiency**;
3. Market segmentation;  
→ selection may **threaten solidarity**.
4. **Bankruptcy** of health plans.



# Contradictory trends?

- In 2007 we concluded (*Health Policy, 2007*) that on the one hand the RE systems have been improved, and on the other hand in all 5 countries there is evidence of increasing risk selection which increasingly becomes a problem, in particular in Germany and Switzerland.
- Some potential explanations can be given for these seemingly contradictory observations.





# *Potential explanations*

Selection may not be a major issue in the early stage, but **over time selection may increasingly become a problem:**

- unfamiliarity with the rules of the game;
- small differences among insurers;
- social health insurers driven by social motives;
- selection no problem because of medical ethics.



# *How can we prevent selection?*

- Risk equalization;
- Less severe premium rate restrictions:  
→ **tradeoff selection - affordability;**
- Excess loss compensations to insurers  
(‘risk sharing between the sponsor and the insurers’):  
→ **tradeoff selection - efficiency.**



# Complex tradeoff

Given insufficient risk equalization we are confronted with a **trade-off** between:

- affordability,
- efficiency,
- and the potential effects of selection, notably low quality care for the chronically ill.



## 6. *How to further improve RE?*

New potential risk-adjusters:

- Co-morbidity: more than only 1 DCG;
- Multiyear-DCG's (rather than one-year);
- Indicators of mental illness;
- Disability or functional impairment (based e.g. on durable medical equipment);
- Yes/no voluntary deductible;
- Multi-year low expenses;
- Overcompensation via the PCGs and DCGs.



## 7. *Implementation issues*

- Risk equalization in practice is very complex! There is no easy solution.
- a lack of (agreement about) good health adjusters that fulfill all relevant criteria;
- A lack of multiyear data with a unique identifier per individual.
- ‘Appropriate incentives’ is often not a relevant criterion.



# *Implementation issues (cnt.)*

- Assessing the acceptable costs;
- Per capita expenditures is known only at a group level;
- Opposition by insurers with a good risk profile;
- Political opposition;
- Start up “surprise problems”;
- Even the simplest risk adjustment mechanisms are complex.



# *Issues in designing / implementing RE*

- Prospective versus retrospective use of risk adjustment information;
- Functional form:
  - Linear Models;
  - “Two part models”:  
$$E(Y) = \Pr(Y > 0 \mid X) E(Y \mid Y > 0, X);$$
- Adjustments for partial years of eligibility: annualizing and weighting.



# *Prospective RE takes time (NL)*

1. The RE formula for year  $t$  must be set in year  $t-1$ .
2. The most recent cost data known in year  $t-1$  are the costs of year  $t-3$ .
3. Collecting individual-level data on costs and characteristics of population in year  $t-3$ .
4. Correcting for relevant differences (e.g. benefit package) between year  $t-3$  and year  $t$ .
5. Political decisions on design of RE-models in year  $t$  and on the available 'budget' in year  $t$ .





# *Prospective RE takes time (NL)*

6. Scaling numbers of individuals per risk class in year  $t-3$  to approximated numbers for year  $t$ .
7. Estimating RE-weights on annualized costs, taking into account the budget for year  $t$  (by ‘inflating’ the cost from year  $t-3$ ).
8. Determining insurers preliminary RE-payments for year  $t$  (usually in September of year  $t-1$ ) based on *expected* risk portfolio (NB: total RE-payment = total expected costs minus a fixed amount  $X$ ).
9. Determining insurers RE-payments for year  $t$  based on *actual* risk portfolio (in year  $t$ ).



# *Implementation of RE takes time*

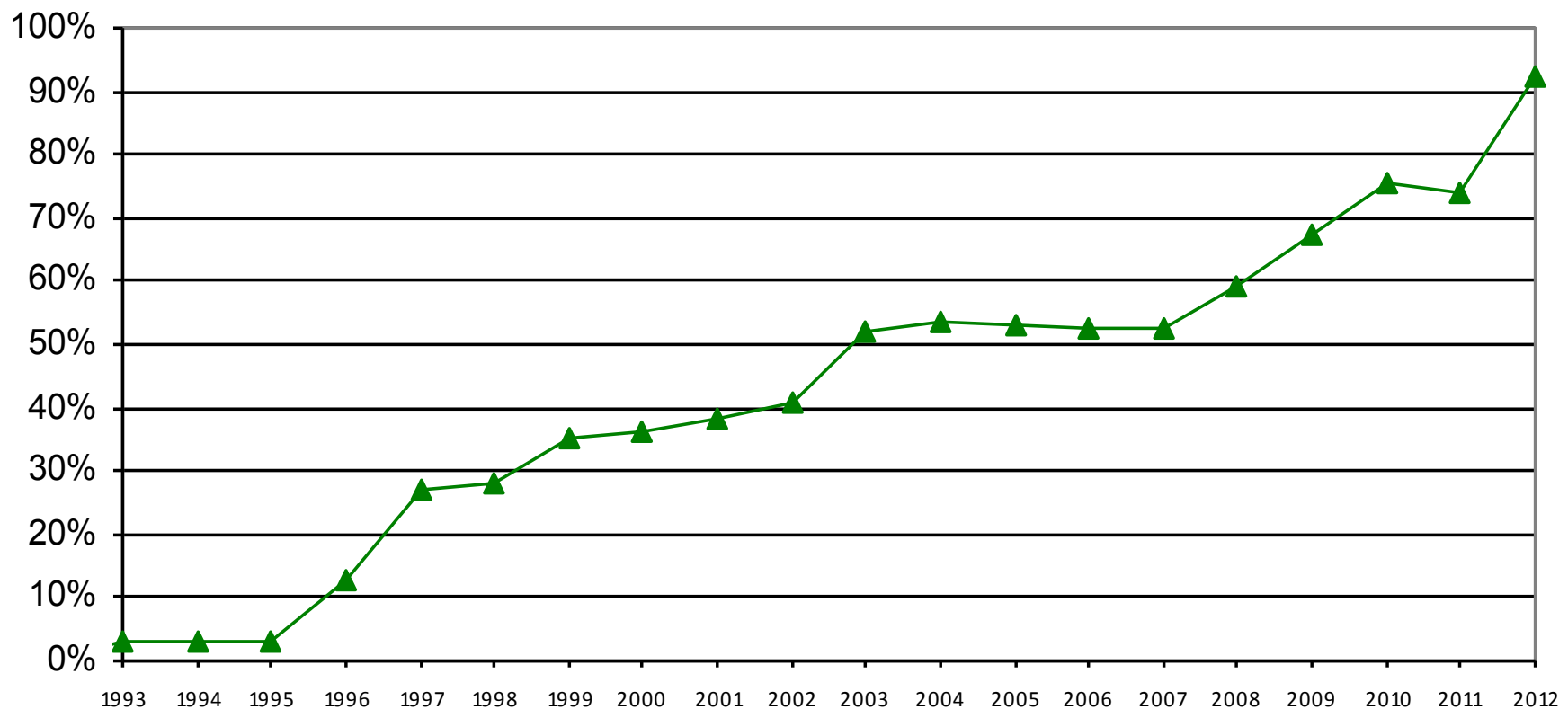
Dutch RE-model for somatic care:

- 1993: Age interacted with gender
- 1995: Region
- 1995: Source of income interacted with age
- 2002: Pharmacy-based Cost Groups (PCGs)
- 2004: Diagnostic-based Cost Groups (DCGs)
- 2008: Socioeconomic status interacted with age
- 2012: Multiple-year High Cost Groups
- 2014: Cost groups based on Durable Medical Equipment
- 2015: Crude interaction between morbidity and age



# *Risk sharing in the Netherlands 1993-2012*

**Gemiddeld financieel risico van zorgverzekeraars (exclusief macronacalculatie en bandbreedteregeling)**





## 8. *Political issues concerning RE*

- What is the level of risk-solidarity that the regulator aims at?
- What are the acceptable costs?
- What are S- and N-type risk factors?
- Policymakers and legislators can easily make serious mistakes and can easily be misled by incorrect arguments (e.g. Ireland, Switzerland, Netherlands).



# Switzerland

In 1994 the Swiss parliament decided to limit the duration of the risk equalization to a period of 13 years only. One argument was that by then consumer mobility should have made the portfolios of all health insurers identical.

This is an incorrect argument: even if that would be the case (quod non), there would be maximum incentives for risk selection.



# *Ireland*

Another example is Ireland, where the legislator made a mistake in the 2003-legislation re-introducing risk equalization.

In 2008 the Irish Supreme Court accepted the argument by insurer Bupa Ireland, at that time the largest contributor to the equalization fund, that the definition of community rating in the grounding 2003-legislation meant that risk equalization was introduced on a wrong legal basis.



# *Ireland (cnt.)*

As a consequence, the 2003-legislation was nullified and retrospective from 2003 till 2008 no equalization transfers could take place. The technical issue in the Supreme Court verdict was related to the subtle difference between:  
community rating **across the market** and  
community rating **per health plan**.

Armstrong J, "Risk equalization and voluntary health insurance markets: the case of Ireland", Health Policy 98 (2010) 15-25.



# *Incorrect arguments (SW & I)*

An example of incorrect arguments is that selecting insurers argue that they have to subsidize their inefficient competitors who have high costs, as often heard in Switzerland and Ireland ('Modality C'). Policymakers are not always able to counter these incorrect arguments.





# *Incorrect arguments (NL)*

Another example is that the Dutch government repeatedly tried to convince the Parliament that the RE works well by showing that the  $R^2$  in analyses explaining the cost variation among insurers' portfolios is 98%.

This is an incorrect argument because ...



# *Incorrect arguments (NL)*

This is an incorrect argument because **this**  $R^2$  depends on the **accidental composition of the insurers' portfolios**. If all portfolios would be identical, **this**  $R^2$ -value is close to 1, even with inadequate risk adjustment. However, if next year a group of undercompensated high-cost consumers switches to another insurer, the  $R^2$ -value may drop considerably.



# *Incorrect arguments (NL)*

Another example is that the Dutch government tries to convince the Parliament that the risk equalization works well by showing that the bandwidth of the average per capita financial result (profit or loss) per insurer is acceptably small.

However, this criterion is also an inappropriate measure of incentives for risk selection because it depends on the **accidental composition of the insurers' portfolios**, as well on the **insurers' efficiency**. It is very hard for individual members of Parliament to disprove these incorrect arguments.



## *9. Lessons learned after 25 years*

1. Risk equalization is the preferred strategy to make health insurance affordable in a competitive insurance market;
2. Risk equalization appears to be complex in practice.
3. Without good risk equalization the disadvantages of a competitive market may outweigh its advantages.



# Conclusions

1. Ample opportunity for selection if age and gender are the only risk-adjusters;
2. Potential profits of risk selection can be quite significant, whilst adverse effects of risk selection are nontrivial;
3. Strategies to prevent risk selection
  - risk adjustment;
  - risk sharing;
  - risk-rated premiums (with a bandwidth).



# Conclusions

- There is no easy solution.
- Policymakers should have a good understanding of risk adjustment: **why, how, and which tradeoffs.**
- Invest in appropriate multiyear data for health-based risk adjustment, including a unique identifier per individual.



# Tradeoffs

Given insufficient risk equalization policymakers may decide to apply

- **premium rate restrictions**, resulting in a *trade-off between affordability and (the effects of) selection*;
- **risk sharing** between the risk equalization fund and the health plans, resulting in a *trade-off between efficiency and selection*.



# *Regulation-induced selection*

Most of the risk selection is not inherent to the “competing-insurer model”, but is the result of one possible form of regulation in this model (i.e. **open enrollment & community rating**) .

Alternative forms of regulation result in other outcomes.





# *Imperfect risk equalization...*

An imperfect risk equalization system may be combined with a *premium bandwidth* rather than with community rating.

The additional information insurers have will then be used for premium differentiation rather than for selection.

→ Tradeoff **selection - affordability**.

Low-income high-risk individuals can receive an premium-subsidy.



# *New way of thinking*

In that approach insurers will focus on efficiency rather than on risk selection, and the chronically ill will become the most preferred clients for efficient insurers, rather than non-preferred ‘predictable losses’.

This will stimulate insurers to contract with providers who have the best reputation for high-quality well-coordinated care for chronically ill people.



# *RE: complex in practice*

- a lack of reliable data at the individual level;
- a lack of (agreement about) good health adjusters that fulfill all relevant criteria;
- opposition by insurers with a good risk profile;
- political opposition;
- start up “surprise problems”;
- *even the simplest risk adjustment mechanisms are complex.*



# *The only effective strategy*

*Good risk equalization is the only effective strategy to resolve the tradeoff between affordability, efficiency and selection in a competitive health plan market.*

Source: WPMU van de Ven , FT Schut, Guaranteed access to affordable coverage in individual health insurance markets, Chapter 17 in *the Oxford Handbook of Health Economics* (eds. Sherry Glied and Peter Smit), Oxford University Press, 2011