Session 23OF, Health Plan Payment in Regulated Health Insurance Markets

Moderator/Presenter:
Michael Cohen, Ph.D.

Presenters:
Thomas McGuire
Richard Van Kleef Ph.D.
Forthcoming:

• A volume that covers theory and practice of health plan payment in regulated health insurance markets

• Theory: 5 conceptual chapters

• Practice: 14 country/sector chapters

• Goal of this session: to give a flavor of developments in theory and practice of health plan payment systems
Session Outline

1. Regulated competition and the role of health plan payment in Germany, the Netherlands and the U.S. Marketplaces

2. Ongoing reforms in risk adjustment

3. Smart forms of risk sharing

4. Discussion
Part 1: Regulated Competition

Germany, The Netherland and the U.S. Marketplaces
What does regulated competition look like?

<table>
<thead>
<tr>
<th></th>
<th>Germany</th>
<th>Netherlands</th>
<th>U.S. Marketplaces</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Role of competition</strong></td>
<td>Individual choice of plans</td>
<td>Individual choice of plans</td>
<td>Individual choice of plans</td>
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<tr>
<td><strong>Flexibility for insurers</strong></td>
<td>Care management</td>
<td>Care management; Provider network</td>
<td>Care management; Provider network; Cost sharing design</td>
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<tr>
<td><strong>What is regulated?</strong></td>
<td>Coverage; Enrollment; Health plan payment</td>
<td>Coverage; Enrollment; Health plan payment</td>
<td>Coverage; Enrollment; Health plan payment</td>
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<tr>
<td><strong>Enrollment</strong></td>
<td>71.5m (2016)</td>
<td>16.9m (2016)</td>
<td>11.8 (2018)</td>
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<tr>
<td><strong>Expenditure</strong></td>
<td>€218.4b (2016)</td>
<td>€42.7b (2016)</td>
<td>$58b (2018)</td>
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<td></td>
<td>Germany</td>
<td>Netherlands</td>
<td>U.S. Marketplaces</td>
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<tr>
<td><strong>Premiums</strong></td>
<td>Single premium per health plan</td>
<td>Single premium per health plan</td>
<td>Limited age bands</td>
</tr>
<tr>
<td><strong>Risk adjustment</strong></td>
<td>Demographics and disease indicators</td>
<td>Demographics and disease indicators</td>
<td>Demographics and disease indicators</td>
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</tbody>
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Part 2: Risk Adjustment

Ongoing reforms
What does risk adjustment look like? Risk adjusters:

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Germany</th>
<th>Netherlands</th>
<th>U.S. Marketplaces</th>
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<tbody>
<tr>
<td>Age</td>
<td>Age</td>
<td>Age</td>
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<tr>
<td>Sex</td>
<td>Sex</td>
<td>Sex</td>
<td>Sex</td>
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<tr>
<td>Reduced earning capacity</td>
<td>Regional factors</td>
<td>Socio-economic status</td>
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<tr>
<td></td>
<td>Source of income</td>
<td>Source of income</td>
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<tr>
<td></td>
<td>Household composition</td>
<td>Household composition</td>
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<tr>
<td></td>
<td>Yes/no</td>
<td>Yes/no institutionalized</td>
<td></td>
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<tr>
<td></td>
<td>Level of education</td>
<td>Level of education</td>
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<td></td>
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<td>Level of education</td>
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<tr>
<td></td>
<td></td>
<td>Geography</td>
<td></td>
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</tbody>
</table>
What does risk adjustment look like? Risk adjusters:

<table>
<thead>
<tr>
<th>Disease indicators</th>
<th>Germany</th>
<th>Netherlands</th>
<th>U.S. Marketplaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>201 hierarchical morbidity groups (HMG) based on:</td>
<td>Cost groups based on:</td>
<td>100 Hierarchical Condition Categories (HCCs)</td>
<td></td>
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<tr>
<td>• prescribed drugs</td>
<td>• prescribed drugs</td>
<td></td>
<td></td>
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<tr>
<td>• in- and outpatient diagnoses</td>
<td>• hospital diagnoses</td>
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<td></td>
<td>• physiotherapy diagnoses</td>
<td></td>
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<td></td>
<td>• durable medical equipment</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• multiple-year high or low spending</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• one-year spending on home care</td>
<td></td>
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What does risk adjustment look like? Methodological aspects:

<table>
<thead>
<tr>
<th>Timing of risk adjustors</th>
<th>Germany</th>
<th>Netherlands</th>
<th>U.S. Marketplaces</th>
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<tbody>
<tr>
<td></td>
<td>Prospective</td>
<td>Prospective</td>
<td>Concurrent</td>
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<thead>
<tr>
<th>Risk adjustment estimation procedure</th>
<th>Germany</th>
<th>Netherlands</th>
<th>U.S. Marketplaces</th>
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<tbody>
<tr>
<td>Weighted Least Squares</td>
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<tr>
<th>Separate models for:</th>
<th>Germany</th>
<th>Netherlands</th>
<th>U.S. Marketplaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Healthcare costs</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>• Sick leave payments</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>• Somatic care</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>• Mental care</td>
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<td></td>
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<tr>
<td>• Age groups</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>• Tiers of coverage</td>
<td></td>
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<tr>
<th>R-squared from the risk adjustment regression</th>
<th>Germany</th>
<th>Netherlands</th>
<th>U.S. Marketplaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>.24</td>
<td></td>
<td>.32 for somatic care .23 for mental care</td>
<td>.35</td>
</tr>
</tbody>
</table>

R-squared from the risk adjustment regression: .24 for Germany, .32 for somatic care .23 for mental care for the Netherlands, and .35 for U.S. Marketplaces.
How do state-of-the-art risk adjustment models perform?
Crucial: which perspective?

• Actuarial perspective: payment fit
  • Individual-level fit (R-squared, prediction errors...)
  • Group-level fit (under/overcompensations, predictive ratios...)
  • Plan-level fit (under/overcompensation, variance...)

• Economic perspective: incentives and welfare effects
  • Risk selection (under/overcompensations, predictive ratios...)
  • Cost containment (power of a payment system...)
  • Fairness (e.g. risk rating versus risk adjustment)
Empirical Results from the Netherlands
Individual-level payment fit (somatic care)
Assessing Group-level Payment Fit

• Estimate risk adjustment model 2016 (N=17mln)

• Determine residual spending

• Merge residual spending with survey information (N=400k)

• Determine average under/overcompensation for survey groups
Self-reported health is good or very good (77%)

Self-reported health is fair, poor or very poor (23%)

No risk adjustment

Risk adjustment model 2016

1,139

194

-3,143

-398
Ongoing challenge

How to reduce remaining incentives for risk selection?

• Improving risk adjustment?

• Risk sharing? (see Part 3)

• Risk rating of premiums?
Improving risk adjustment

Two main strategies:

1. New risk adjustors
   - Data requirements, incentives...

2. Optimization of payment weights
   - Which selection actions are possible? What are their welfare effects?
   - \( \rightarrow \) OLS payment weights are not necessarily optimal!
Optimization of payment weights

Promising direction = ‘constrained’ regression:

For a given set of risk adjustors, find the payment weights that:

• Minimize the residual sum of squares
• Given a (set of) constraints
For example: payment weights must reduce blue bars to zero!!!
Conclusions

• Regulated competition is hot
• Health plan payment as a cornerstone
• Ongoing challenge: mitigating risk selection incentives
• Utilization/cost-based risk adjustors come with trade-offs
• Optimization of payment weights as a ‘new’ direction
• Next: Risk sharing as a supplement to imperfect risk adjustment
Part 3:

Two-Sided Reinsurance and Risk Adjustment in Individual Health Insurance: Germany, The Netherlands and the U.S. Marketplaces

Thomas McGuire
Boston, US

Sonja Schillo
Essen, GER

Richard van Kleef
Rotterdam, NETH
Mindset

Two major design issues for risk adjustment:
1. Selection of risk adjustor variables
2. Selection of payment weights
This paper deals with the second issue

Two major design issues for risk sharing:
1. Determining risk sharing budget
2. Allocation of risk sharing payments
This paper deals with both issues
Teamwork?

• Risk adjustment weights and risk sharing parameters are generally set independently – not ideal

• Weights should be based on plan spending obligations (e.g., role of deductible in NETH)

• Risk sharing not needed for costs already captured by risk adjustment
Goal of Paper: Improve Teamwork

**Today:**
Optimize risk-sharing payments in the presence of risk adjustment
Quantify gains in fit at the individual level as risk sharing is increased

**Stay tuned:**
Optimize weights and risk sharing simultaneously with least squares regression
Quantify gains in fit with full teamwork between risk adjustment and risk sharing
Some Research on Teamwork


Objective Function

• Health plan payment systems are evaluated on numerous criteria.

• All(?) countries with risk adjustment use minimization of sum of squared residuals (SSR) as criterion for optimal payment weights (we also track the linear form -- CPM).

• Specifically, we use the generalization of $R^2$ – Payment System Fit (PSF).

• This paper focuses only on PSF leaving more comprehensive evaluation for country-specific research to follow.

• Teamwork between risk adjustment and risk sharing will help for any objective function.
Main takeaways

• Empirical: Sophisticated risk adjustment systems create over and underpayment

• For modest levels of total risk sharing, reinsurance is the optimal form of risk sharing

• Reinsurance should be targeted at the residual spending after risk adjustment

• Reinsurance can be paired with repayments for overpaid enrollees

• Very small amounts of targeted risk sharing more than doubles the PSF in all three countries
Distribution of Health Care Spending

Frequency
In population

mass at zero

Spending Y

multiple millions
Conventional Reinsurance Defined in Terms of Spending

- Frequency
  - In population

- Spending Y
  - Attachment point
  - Mass at zero

- Multiple millions
Distribution of Residuals from Risk Adjustment Model

Residuals: $Y - \sum X \beta$

Frequency
In population

hundreds of thousands
0
multiple millions
Reinsurance Defined in Terms of Residuals from Risk Adjustment Model

**Frequency**

In population

\[ Y - \sum X \beta \]

positive threshold \( T^+ \)

reinsurance

hundreds of thousands  \( \rightarrow \) 0  \( \rightarrow \) multiple millions

Residuals
Two-Sided Reinsurance Defined in Terms of Residuals from Risk Adjustment Model

Residuals $Y - \sum X\beta$

Frequency
In population

negative threshold $T^-$
repayments

positive threshold $T^+$
reinsurance

hundreds of thousands
0
multiple millions
Three-country Comparison
Data

Administrative from a nationwide sickness fund in Germany

N=1.38m each
Empirical approach

1. Estimate RE model 2015 on training sample
2. Calculate residuals on test sample
3. Apply reinsurance (and repayments)
4. Finance net reinsurance with flat reduction in RE payment
5. Evaluate using Payment System Fit
Germany: distribution of residual -10,000 to 10,000

94.89% of population
Germany: distribution of residual <-10,000

- 0.96% of the population
- 0.42% of the population

1% threshold
2% threshold
Germany: residual-based reinsurance and repayments

The diagram shows the relationship between the fraction of spending in the repayment pool and the payment system fit. The x-axis represents the fraction of spending in the repayment pool, ranging from 0% to 2%. The y-axis represents the payment system fit, ranging from 0.0 to 0.7. The diagram includes bars for different fractions of spending in the reinsurance pool: 0%, 1%, and 2%.
Residual-based reinsurance / repayments: Country comparison

Fraction of spending in reinsurance pool / repayment pool

- U.S. Marketplaces
- Netherlands
- Germany
Repayments: a New Frontier for Health Plan Payment Systems?

• Will certainly improve fit, but given the magnitude of overpayment residuals relative to underpayment residuals, reinsurance improves fit more for a given incentive loss

• Are overpayments predictable (by individual/by plan)? Do repayments correct for imperfect signals in risk adjustment?

• An independent argument that plans should not make hundreds of thousands of Euro/dollar profits on single enrollees?

• “Who are these guys?” -- We need to know more about the enrollees and the causes of overpayments before making policy decisions.
Final Comments

• Reinsurance/repayment yields very large improvements in fit with a small sacrifice in incentives

• Targeting residuals strictly dominates policies targeting spending levels

• Teamwork will improve when we optimize weights for the presence of risk sharing [how much we are not sure]

• Country-specific research necessary to evaluate payment alternatives more comprehensively – ongoing in all three countries

• “Who are these guys?” The extreme outliers plus/minus need to be understood better
Questions and Discussion