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Rayna Stoyanova
Helmut Gründl
Sebastian Schlütter

Safety versus Affordability as Targets of Insurance Regulation: A Welfare Approach

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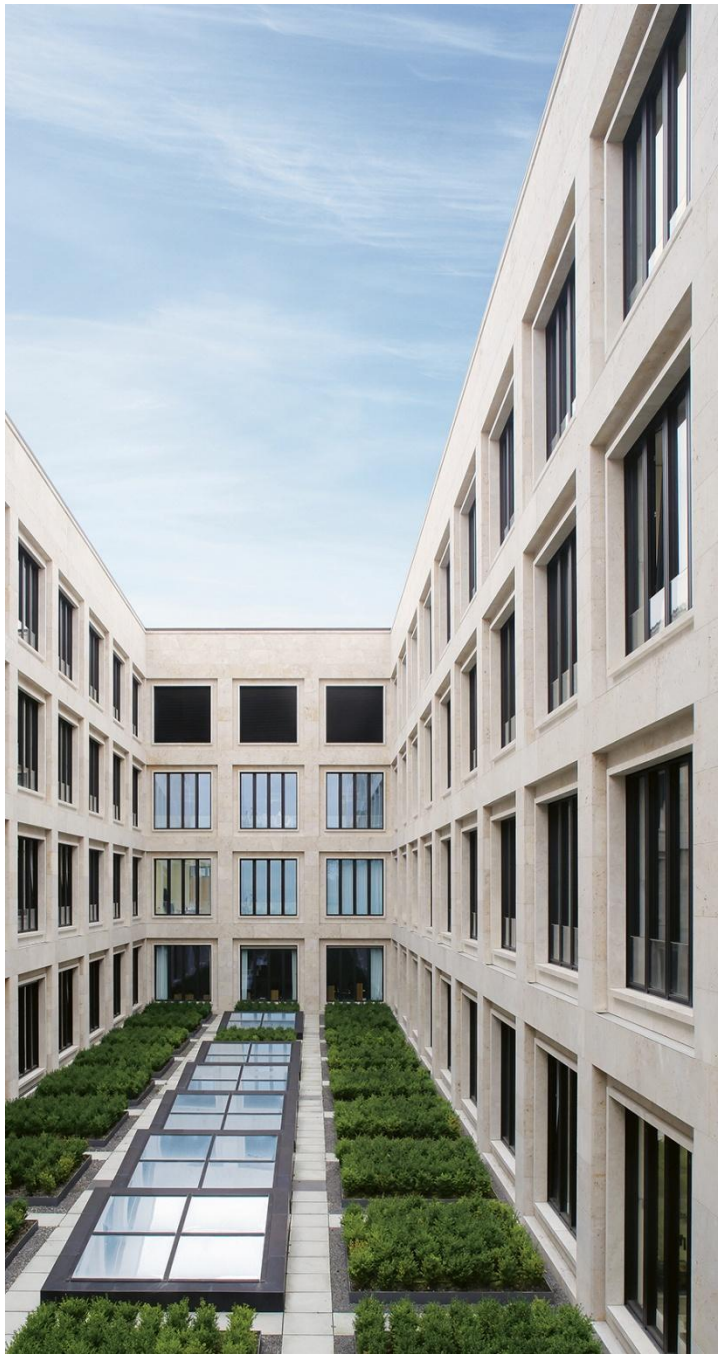

Agenda

- Motivation
- Literature overview
- Model framework
- Results and Discussion
- Outlook and further research

Motivation

Regulatory targets

- Solvency and stability in the insurance markets
- Affordability of insurance coverage

Use of different regulatory tools

- Solvency regulation in the sense of risk-based capital requirements
- Price regulation
  - Workers‘ compensation, automobile insurance (USA)
  - Base-rates in the private health insurance (DE)
  - Surplus participation

Literature overview (selection)

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Effects of Regulation	Solvency Regulation	**Rees et al. (2009):** Solvency regulation is unnecessary if the expected-utility maximizing consumers are fully informed about the insurer's default risk, and if risk management is free of transaction costs.
		Filipovic et al. (2009): Solvency regulation diminishes inefficiencies caused by the risk-shifting problem.
		Munch und Smallwood (1980): Minimum capital requirements reduce the number of insolvencies, but do so only because they reduce the number of small firms in the market.
	Price regulation	**McCabe und Witt (1980):** A price ceiling motivates insurers to extend their settlement period and hence reduce product quality.
		Klein et al. (2002): The more stringent price regulation is, the higher are the firms' degrees of leverage, as a proxy for risk.
		Tennyson (2007), Weiss et al. (2010): Price regulation in the sense of price suppression weakens market competition by reducing the number of firms.

Our Contribution

We provide a framework

- that helps to find the optimal mix of regulatory tools
- by combining policyholders' and shareholders' interests
- in a microeconomic context .

We study

- the effectiveness of the regulatory tools
  "price ceilings" and "equity capital requirements"
- for achieving the regulatory targets "affordability" and "safety".

Model Framework

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Regulator

- has one of two objectives:
  (1) to maximize **consumers' welfare**;
  (2) to maximize **total welfare**
- imposes **restrictions** on the insurer's safety level and/or on its prices

Insurer

- maximizes the **shareholder value**
- makes decisions on its risk management strategy and underwriting activities under regulatory constraints, i.e. determines the **SHV-maximizing price** and **default ratio**

Consumers

- **observe** the default risk and price of the insurance product
- **react** to these figures through their buying decisions

Shareholders

- provide initial equity endowment, going along with **frictional costs** (e.g. taxation, agency issues)

Objective Functions

Shareholder Value:
A risk neutral valuation function

$$SHV = \varphi(E_1) - K$$

Consumer surplus:

a measure of the cumulated policyholders' utility;

the sum of the differences between the reservation price and the offered insurance price over all consumers buying the insurance product for a given default risk

$$CS(p, dr) = \int_{p}^{p_{\max}} y(p, dr)\,dp$$

Total welfare:

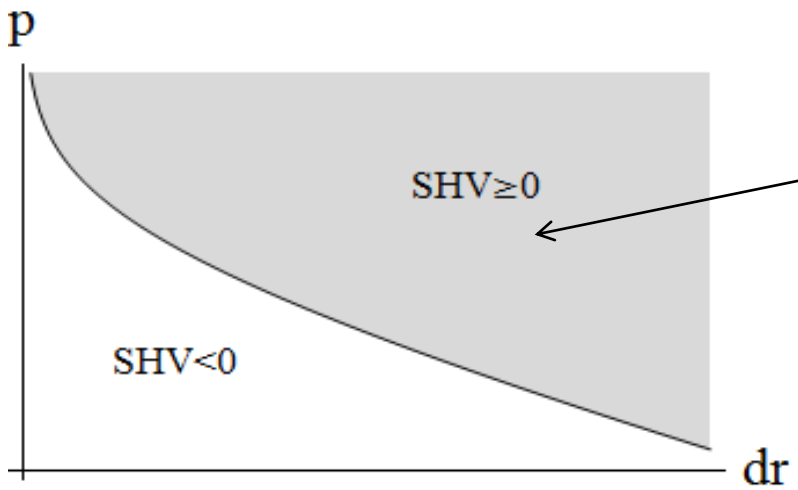
the sum of consumer surplus and shareholder value

$$TW = SHV + CS$$

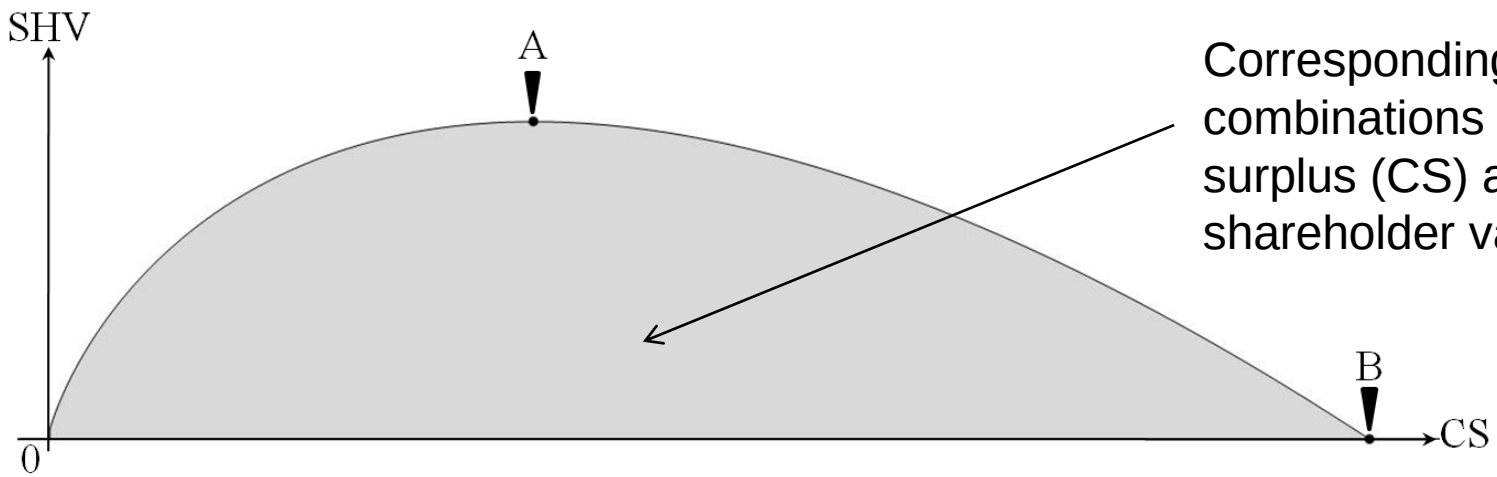
Insurance demand function models the cumulative reaction of consumers to price and default risk.
Example: Zimmer, Gründl, Schade (2009)

$$y(p, dr) = n \cdot e^{-f_p p - f_{dr} dr}$$

Graphical representation



All feasible combinations of price and default ratio which fulfill the participation constraint

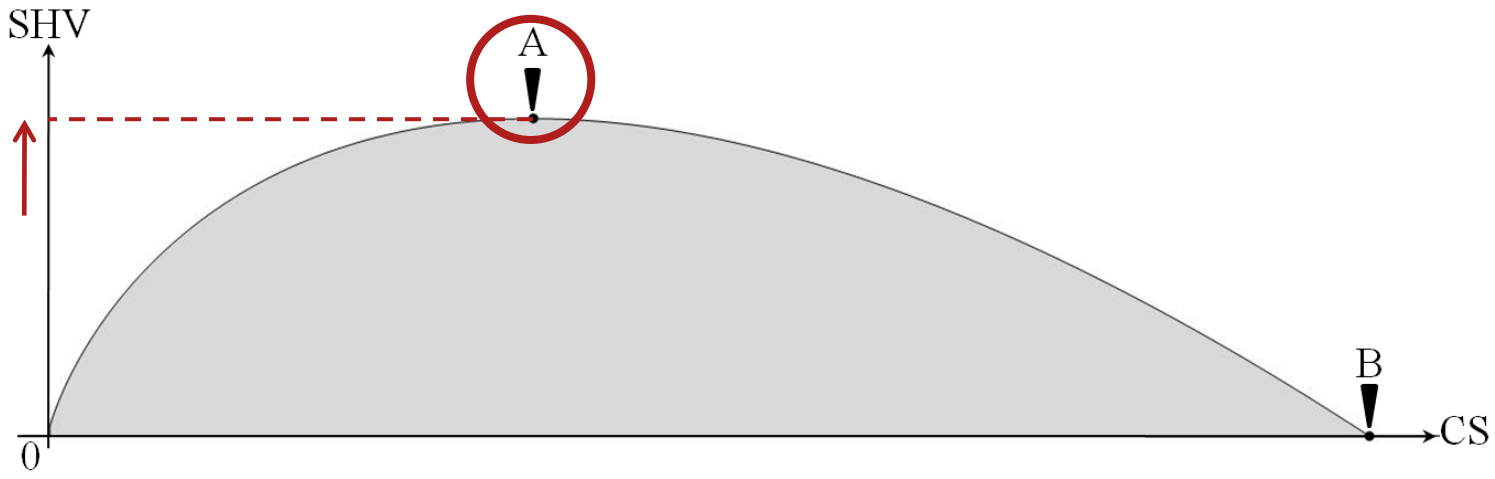


Corresponding possible combinations of consumer surplus (CS) and shareholder value (SHV)

The Unregulated Insurance Market

The insurer

- maximizes its shareholder value,
- and chooses SHV-maximizing price and default ratio.

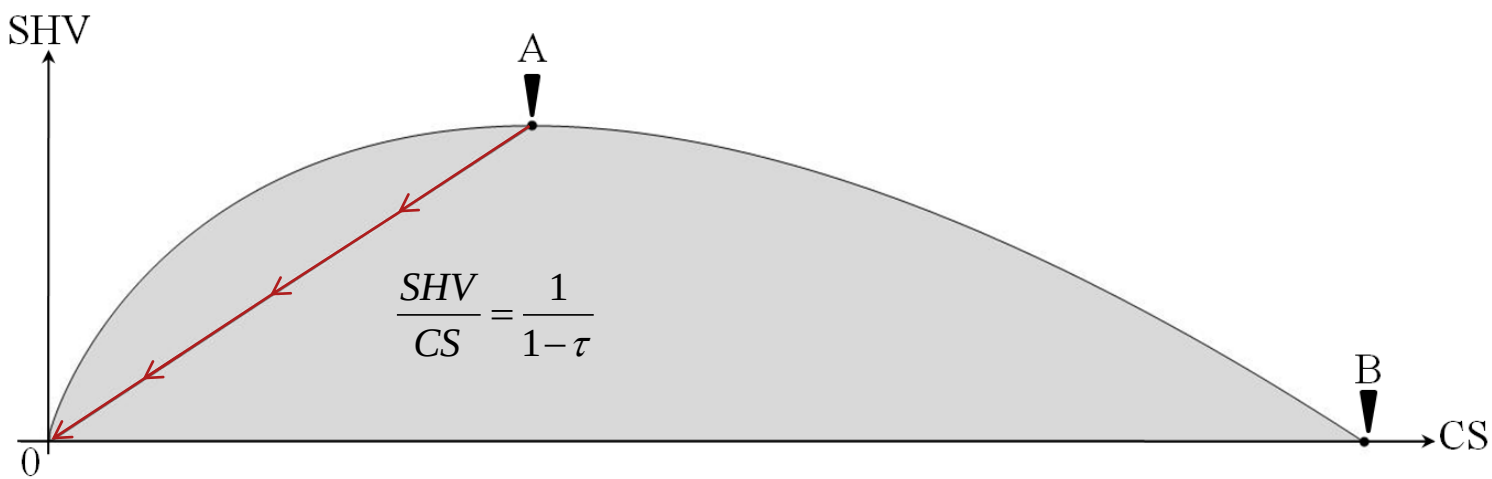


Capital Regulation in the Absence of Price Regulation

The regulator sets minimum capital requirement such that firm's default ratio does not exceed a predefined ceilling

Insurer's maximization problem: $$p^*(dr^{reg}) = \arg\max_p SHV(p, dr^{reg})$$

Effects of capital regulation: Capital restrictions in the absence of price regulation are not effective in the sense of consumer surplus and total welfare maximization.



Price Regulation in the Absence of Capital Regulation

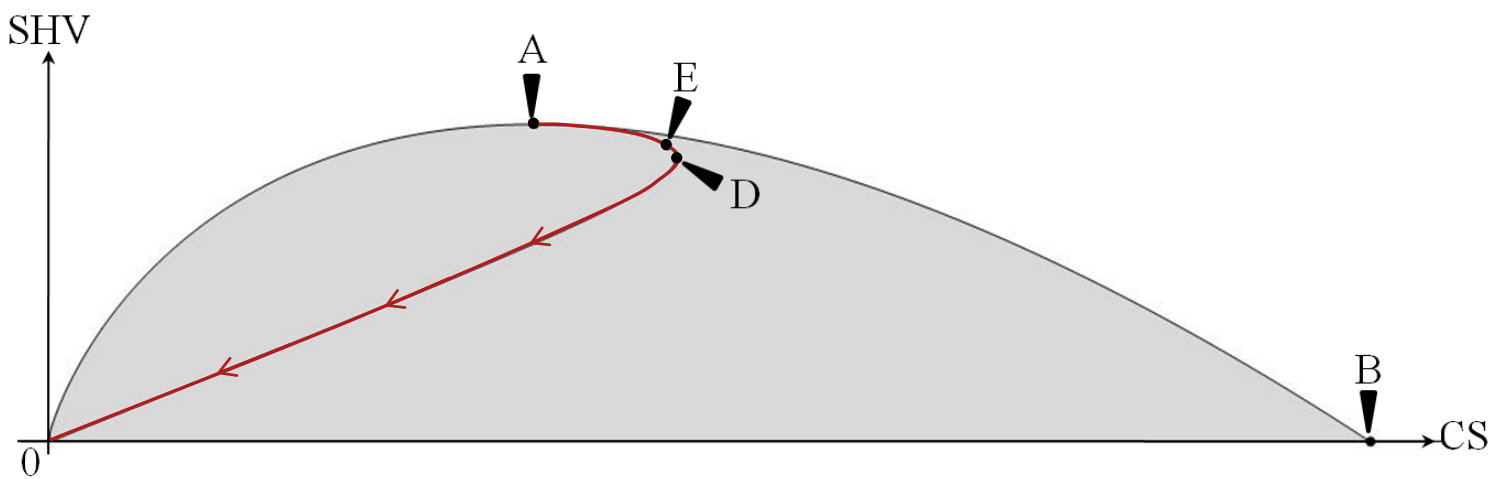
The regulator determines price-cap, i.e. maximum allowed price

Insurer's maximization problem:

$$dr^*(p^{reg}) = \arg\max_p SHV(p, dr^{reg})$$

Effects of price regulation:

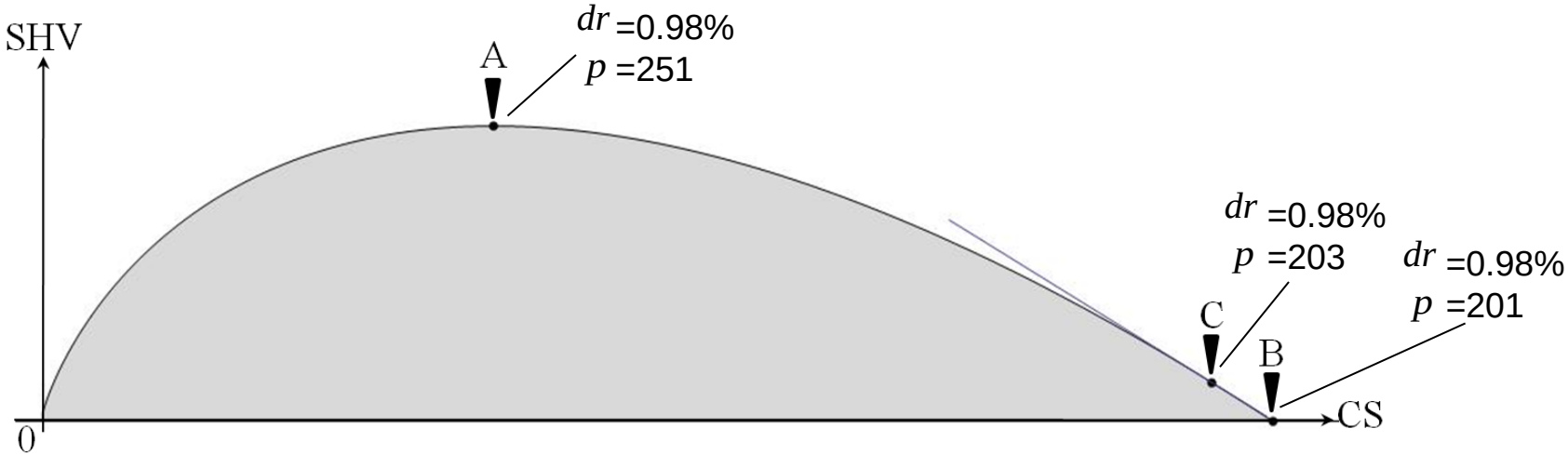
(1) Moderate price ceilings lead to an increase of consumer surplus, but stringent price ceilings lead to a reduction in consumer surplus.
(2) Total welfare increases insofar as that the increase in CS is higher than the decrease of SHV.



Regulation of Capital and Prices

The regulator restricts both default ratio and price according his objective functions.

Effects of regulation: **(1)** The global optimum of consumer surplus maximization can be attained if the regulator restricts the safety level and sets the price to the fair premium. **(2)** For total welfare maximization, the regulatory price lies above the fair premium.



Outlook and further research

Verify the robustness of the results by analyzing different combinations of the form of the insurance demand function and its parameterization

Study the circumstances under which solvency regulation could be advantageous for different stakeholder groups

- risk-shifting problem
- hidden characteristics problem
- agency problem between shareholders and managers

Design insurance contracts providing wealth transfer mechanisms, which make it advantageous for the shareholders to undertake a total welfare optimal strategy