Regulatory Environment and Pension Investment Performance

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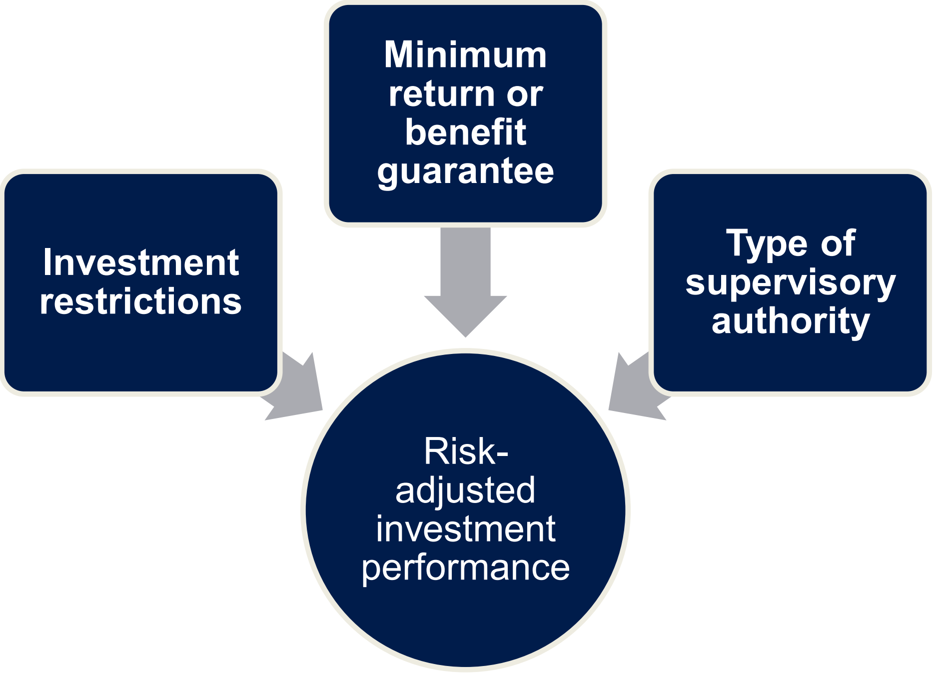
Research question

What is the impact of funded pension funds' regulation on risk-adjusted investment performance ?



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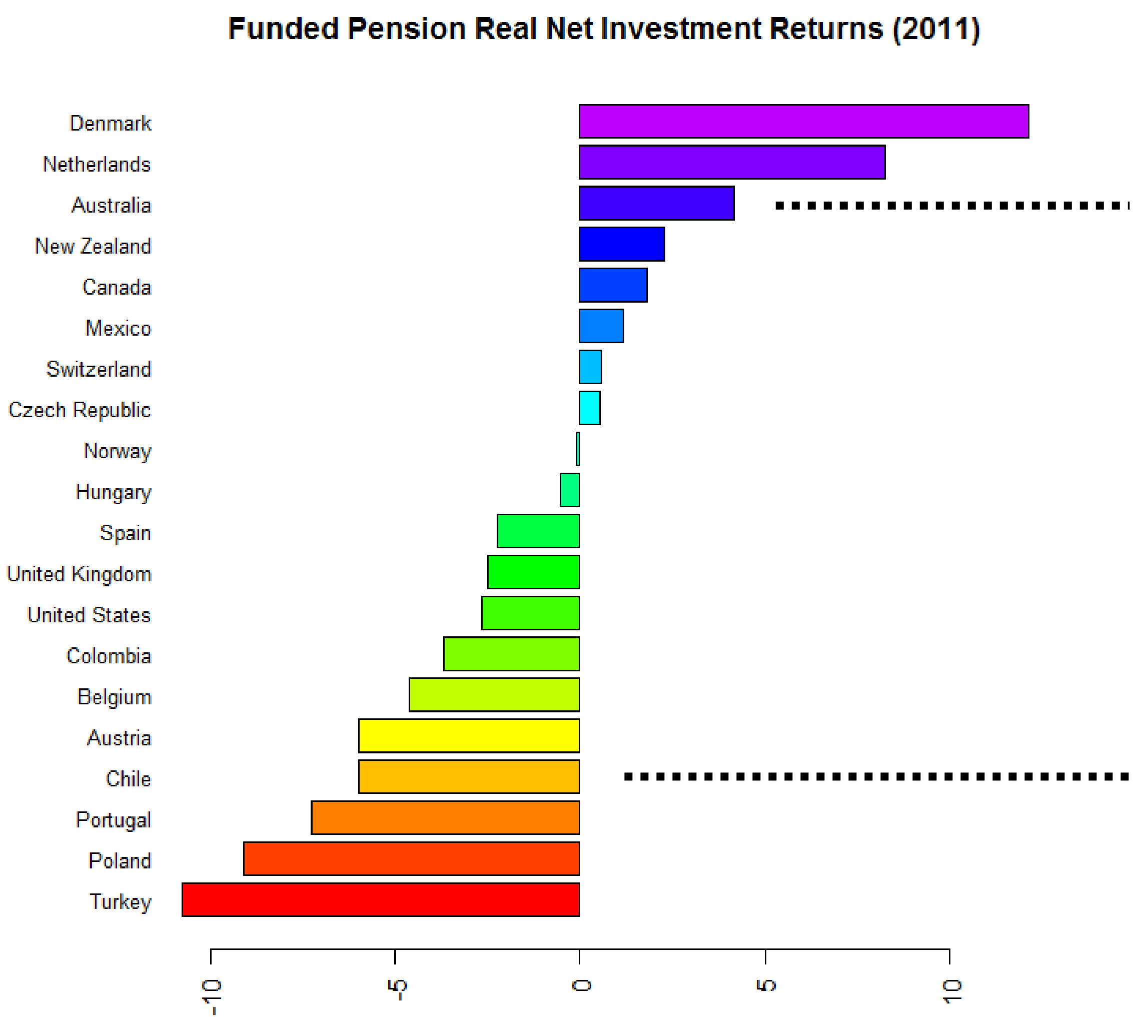
Motivation: An Observation



Australia

- No portfolio limits imposed
- Diversification focus
- No investment limit by issuer

Chile

- Max limit in equities ranging from 5-80% depending on fund, minimum limit from 0-40% depending on fund
- Various limits on bonds, retail investment fund and foreign assets.
- Investment in real estate, private investment fund prohibited.
- Multitude of investment limits in issuer

Source: OECD Global Pension Statistics, Survey of Investment Regulation of Pension Funds (OECD)

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Regulation as a Spectrum

Aspect	Regulation		
Investment Restrictions	High	Medium	Low
Minimum Guarantee	Protection funds		Book reserves/ in-house funds
Supervision	Integrated		Specialized
Coverage	Mandatory Occupational	Quasi-mandatory	Voluntary Personal
Benefits	DB	Hybrid	DC
Governance	Collective	Employer-led	Individual
Indexation	Legal requirements	Self-regulation	No rules
Vesting	Immediately		Longer period

Adapted from Ebbinghaus (2010), *Varieties of Pension Governance: The Privatization of Pensions In Europe*, Oxford University Press

Investment Restrictions

Minimum or maximum portfolio limits by asset class.

	For	Against
Reason e.g.	Ensure **adequate diversification**, protect beneficiaries against sponsor insolvency and financial risks**.**	**Impede optimal portfolio selection**
Example	On equities in 2007: 30% limit on domestic equities in Switzerland, 35% limit in Norway, 0-30% limit in Mexico, 0-80% limit in Chile.	Australia, New Zealand, the Netherlands, Ireland, UK, US impose no direct limit any asset class.

Minimum Guarantee

Plans promise a minimum rate of return, benefit guarantee.

	For	Against
Reason e.g.	Provide a certain level of **financial security** to members.	Investment managers induced to take high risk if the shortfall is **guaranteed** to some extent by a **central guarantee fund/ the government**.
Example	Chile: minimum return guarantee that is backed by the government. UK: “Pension Protection Fund”.	DC funds with no minimum guarantee: • U.S 401(k) • Australia’s Superannuation

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Specialized Supervisory Authority

Whether the supervisory authority supervises pension provision institutions only

	For	Against
Reason e.g.	Differences among financial institutions necessitate a **unique approach** to regulation on each.	Avoid **heterogeneous and secondary objectives** to be fulfilled by numerous smaller regulators.
Example	An Bord Pinsean (Pensions Board) in Ireland. La Superintendencia de Pensiones in Chile.	De Nederlandsche Bank supervises banks, insurers and pensions in the Netherlands. Komisja Nadzoru Finansowego (Polish Financial Supervision Authority) in Poland.

Summary of Findings

Investment restrictions	Minimum return or benefit guarantee	Type of supervisory authority
Lower risk-adjusted investment returns in emerging market economies.	No statistically significant influence	(Weak evidence) Specialized SA generates slightly higher Sharpe ratio in advanced economies.

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Related Literature

Mutual funds context

- Almazan et al (2004) find no relation between investment restrictions on the policy statements of mutual funds and their returns.
- Agarwal et al. (2013) reveal that mutual funds' investment performance were harmed by an increase in the disclosure frequency.

Meanwhile, for pension funds

Descriptive:
Tapia (2008) reports asset allocation, fund size and other summary statistics for private pension funds in 23 countries

Theoretical:
Philip Davis (2002) assesses the justification, nature and consequences of prudent person rules and quantitative portfolio regulations. Hinz et al. (2010) evaluate investment performance measures for pension funds, taking into consideration particular characteristics and objectives of pension systems

Geographically localized:
Focusing only on Latin American countries, Srinivas and Yermo (2010) find that tight regulatory regimes common in that region have yielded lower risk-adjusted return compared to market benchmarks.

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Data

27 countries, annual data from 2002-2010.

Advanced Economies (18)	Australia, Austria, Belgium, Canada, Denmark, Germany, Ireland, Israel, Italy, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.
Economies in Transition (4)	Croatia, Czech Republic, Hungary, Poland
Emerging Market Economies (5)	Chile, Colombia, Mexico, Peru, Turkey

Sources:
OECD Global Pension Statistics (OECD GPS), the Federación Internacional de Administradoras de Fondos de Pensiones (FIAP), the Association of Latin American Pension Supervisors (AIOS), Croatian financial services supervisory agency (HANFA), International Monetary Fund, World Bank World Development Index, Bloomberg, Datastream.

Methodology

Ordinary Least Squares Regression on cross-sectional data.

Dependent Variable = **Independent Variable** + **Control Variables** +

Error Term + Constant

Sharpe Ratio of Pension Investment Return

I. Investment Restrictions,
II. Minimum Guarantee,
III. Supervisory Authority.

(II) and (III) are constructed as dummy variables.

I. Market Performance,
II. Pension Design.

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Methodology – Investment Restriction (Global)

Global Index, IR^G

Consider **nine** asset (sub-) class:

Equities (listed & non-listed), bonds, real estate, investment funds, loans, bank deposits, foreign assets (OECD & non-OECD issued).

Construct a **global index of investment restrictiveness**.

Example
In 2004,

	Equity	Real Estate	Bonds	Investment Funds	Loans	Bank Deposits	Foreign Assets
Austria	50%	20%	No limit	No limit	No limit	No limit	50% non-Euro
Index	+1	+1	0	0	0	0	+1

Source: OECD Annual Survey of Investment Regulation of Pension Funds (2004)

Index for investment restrictiveness for Austria in 2004 is 3.

Methodology – Investment Restrictions (Refined)

Refined index, $IR^{e,b,f}$

Three major asset classes: equities (e), bonds (b), foreign assets (f).

$IR^{e,b,f}$ = 100% - Maximum Investment Allowed (as a % of portfolio) in e, b, or f.

Example
In 2004,

	Equity	Real Estate	Bonds	Investment Funds	Loans	Bank Deposits	Foreign Assets
Austria	50%	20%	No limit	No limit	No limit	No limit	50% non-Euro
Refined Indices	$IR^e = 100\% - 50\%$		$IR^b = 100\% - 0\%$				$IR^f = 100\% - 50\%$

Source: OECD Annual Survey of Investment Regulation of Pension Funds (2004)

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Methodology – Emerging Market Economy

Emerging Market Economy, EME

International Monetary Fund's (IMF) yearly classification in the "World Economic Outlook"

Level of development	Score
Advanced Economies	0
Economies in Transition	0.5
Emerging Market Economies	1

Example

	2002	…	2010
Austria	Advanced Economy		
Score	0		

EME = Average over 2002-10 score

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Methodology – Control Variables

Market Performance

- Sharpe ratio of the local equity and bond markets indices
- Two largest asset classes in which pensions invest
- Control for the investment performance that is attributable to market return

Design Features

Heterogeneity of the plans

- Defined Contribution or Defined Benefit
- Mandatory or Voluntary
- Occupational or Personal

DC = % of DC funds within the aggregated data of the country
MV = % of mandatory funds within the aggregated data of the country
OP = % of occupational funds within the aggregated data of the country

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Methodology – Regression Specification

Dependent Variable = 1 **Independent Variable** + **Control Variables** +

2 **Independent Variable** × **EME** +

Error Term + Constant

Sharpe Ratio of Pension Investment Return

I. Investment Restrictions,
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Regression Results

Independent Variable and Estimated Coefficient (Standard Errors)	1 Non-interacted	2 Interacted with EME
IR^G	**0.120**** (0.053)	**-0.635**** (0.248)
IR^e	0.001 (0.006)	**-0.024*** (0.013)
IR^b	0.006 (0.007)	-0.024 (0.015)
IR^f	0.005 (0.005)	**-0.024**** (0.010)
MG	0.027 (0.306)	-1.146 (0.904)
SA	**0.758*** (0.390)	-0.548 (0.675)

*p < 0:1; **p < 0:05; ***p < 0:01

Conclusion

Investment restrictions

Lower risk-adjusted investment returns in emerging market economies.

Minimum return or benefit guarantee

No statistically significant influence

Type of supervisory authority

(Weak evidence) Specialized SA generates superior Sharpe ratio in advanced economies.

Restrictions on equities and foreign assets are associated to lower risk-adjusted investment return.

With improved data quality and consistency if its collection across countries is standardized:

- refined measure of performance, e.g. fees-adjusted return,
- refined measure of strictness of regulation, e.g. fund-level data for restriction by fund.

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