Factors that impact on pension fund investments in infrastructure under the current global financial regulation

Javier Alonso, Alfonso Arellano and David Tuesta

Implications of the New Regulatory Order for Retirement System Risk Management

The Wharton School. University of Pennsylvania
April 29/30, 2015

Outline

Current trends

- A **context of global pension reform**: From DB to DC. PAYG pension reforms have been **reducing their generosity** (towards lower replacement rates) and providing more space for individual's savings decisions

- **Lower long term returns** plus **increasing life expectancy** are negatively impacting replacement rates

- Under this scenario, financial system and governments shows a **growing interest** to open more spaces for **pensions funds to invest in physical infrastructure**. Some reasons:

  - Higher **returns** adjusted to risk. **Stability of resources**. Counterbalance effect on **portfolios**. Protect against **inflation**. Successful **experiences** (Australia and Canada)

  - **Long- maturity matching** between pension fund portfolio and infrastructure projects

  - **Matching interest** of PF managers with those of **government and policy makers** (in a context of low growth scenario): **fiscal budget and economic growth**

- However, this interest is interacting with a process of **global financial regulatory** changes. **How undergoing changes in financial regulation could affect pension fund investment in infrastructure?**

Goals

- Main goal: provide a broad approach about the **factors that affects pension fund investment in infrastructure, with a particular focus on the importance of financial regulation**

- Other goals:

  − A review of the **experiences of pension funds investing in infrastructure** around the world and why this is interesting for them

  − A **survey/ balance of global financial regulatory changes**

Global financial regulation and infrastructure investment

- The **financial crisis in 2007-08** revealed the weaknesses of the financial system due to the **high leverage** of the lending institutions, their **liquidity problems** and the low level and **quality of their capital**

- **Basel II and Basel III** obliges the lending institutions to **improve the quality and quantity of their capital**, improve their **risk management** systems, reduce **leverage**, **increase liquidity** and take **counter-cyclical measures**

- Longer is the time horizon of a loan, higher is the consumption of capital. As a result, **traditional financers (banks) lose their appetite to continue funding such projects**

- In this context, **governments seek a more intensive participation of other financial players** (such as insurance companies and pension funds) **and wonder what are the barriers that have prevented a more intense participation**

How much are pension funds investing in direct infrastructure?

Pension Funds' Infrastructure Investment 2013 (as a % of total portfolio)
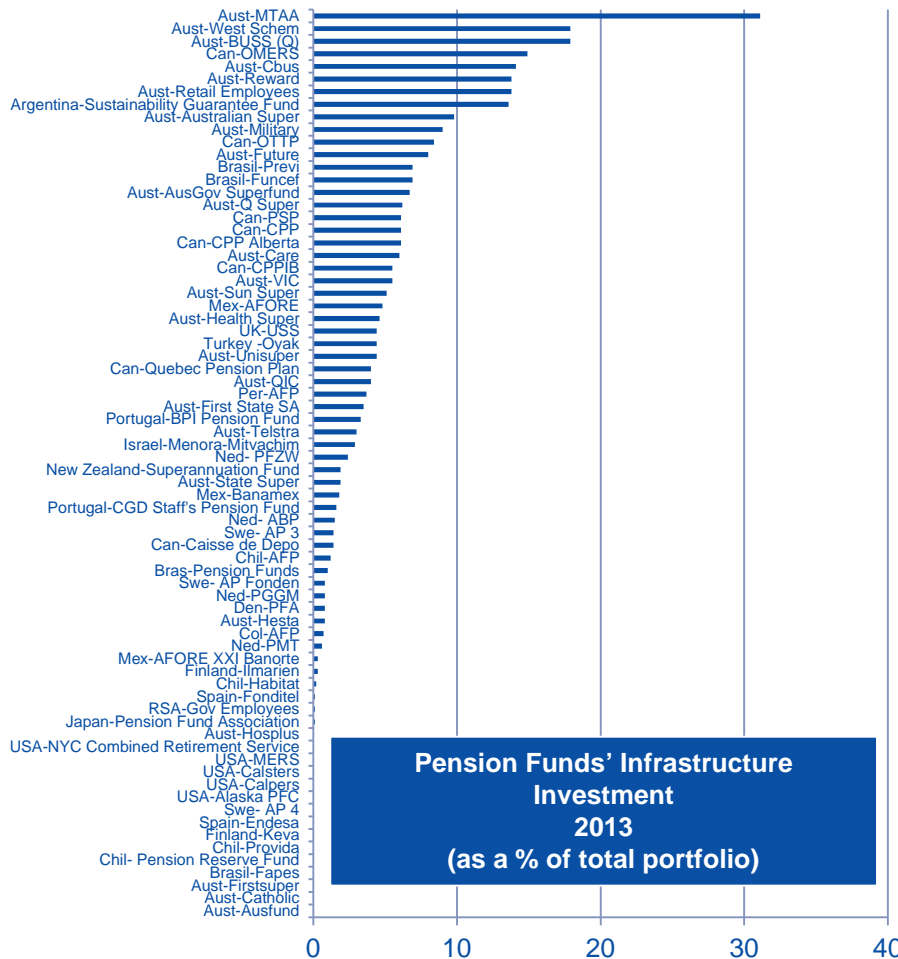
- Sample of 72 pension funds from 21 countries (data 2010-13)

- Investing in infrastructure: from 0% to 31% of total PF's portfolio:

  - Average sample: 4.3% of portfolio

  - **Average of those investing: 5.4% of portfolio**

- Australian and Canadian pension funds are those investing more in infrastructure:

  - Australian pension fund average: 7.5% of portfolio

  - **Australian pension funds currently investing: 8.6% of portfolio**

  - Canadian PF average-sample: 6.6% of portfolio

  - **Canadian PF currently investing: 6.6%**

Source: Inderst (2014), OECD (2014), Tuesta (2013), OECD (2012), Weber and Alfen (2010), Torrance (2008), Future Fund Board (2011),
Infrastructure Partnerships Australia (2010), Mcquire (2010),

Pension funds and their investments in infrastructure

Determinants of investment in infrastructure

Specific determinants of pension funds

- Regulation of investments by pension funds

- Pensions funds' knowledge and understanding of infrastructure projects

- Tradition of investment in infrastructure

- Own incentives of the structure of the pension system (defined benefit vs. defined contribution)

Global determinants for all the financial investors

- The availability of good projects

- Rule of law

- Mitigation risk tools

- Global Financial Regulation

Pension funds and their investments in infrastructure; regulation issues

Until now, regulation of PF infrastructure investment has national coverage

Geographies with extremely flexible financial regulation

- They assume that the **best entities to assess the risks of the project are the investors** themselves, and as such, they only establish that the investments should be "prudent" and well planified (OECD, 2014)

- This group typically comprises the Anglo-Saxon countries (the United Kingdom, the United States, Australia and Canada), plus Belgium and the Netherlands

Regulation of infrastructure investment by means of limits or conditionality

- Regulation in countries that set limits on pension fund investment in infrastructure is tremendously varied

- **A third** of the countries analysed in OECD (2014) **do not allow** investment in **private investment funds or in direct loans**

- In terms of investment in **shares**, the **majority** of countries **do not allow investment in unlisted instruments** and have limits for **quoted assets**

The empirical evidence of the limiting factors in the investment in infrastructure by PF

A principal components synthetic Index of regulatory openness for the investment of pension funds in infrastructure

Portfolio limit in domestic asset categories = 0.3850 × Equity_in + 0.3640 × Real Estate_in + 0.3863 × Bonds_in + 0.3896 × Retail Investment Funds_in + 0.3832 × Private Investment Funds_in + 0.3603 × Loans_in + 0.3763 × Bank Deposits_in

Country	Index	Country	Index	Country	Index	Country	Index
Belgium	10,58	Sweden	7,93	Iceland	6,01	Zambia	4,91
Canada	10,58	Germany	7,93	Jordan	6,01	Nigeria	4,57
Ireland	10,58	Korea	7,78	Switzerland	5,68	Nigeria	4,57
Netherlands	10,58	Portugal	7,61	Brazil	5,68	Romania	4,57
Gibraltar	10,58	United States	7,59	Malta	5,66	Czech Republ	4,33
Malta	10,58	Hungary	7,22	Poland	5,50	Albania	4,18
Malawi	10,22	Greece	6,80	Bulgaria	5,50	Colombia	4,18
Australia	9,86	Mauritius	6,79	Slovak Repub	5,32	China	4,18
United Kingd	9,86	Austria	6,74	Armenia	5,31	Pakistan	4,18
Israel	9,85	Italy	6,47	Armenia	5,31	Russian Fede	3,98
New Zealand	9,83	Turkey	6,47	Costa Rica	5,29	Maldives	3,79
Norway	8,71	France	6,43	Slovenia	5,29	Egypt	3,74
Japan	8,41	Thailand	6,10	Tanzania	5,29	Dominican Re	3,38
Estonia	8,36	Trinidad and	6,07	Peru	5,29	Chile	3,07
Jamaica	8,31	South Africa	6,07	Kenya	4,93	Uganda	3,02
Luxembourg	7,95	Spain	6,06	Republic of N	4,93	India	2,30
Finland	7,94	Mexico	6,04	Namibia	4,91	Ukraine	2,25

Source: OECD (2014a) and BBVA Research

Anglo-Saxon countries plus Belgium, Netherland and Israel shows the highest regulation openness

High variability in EU countries (ex. Belgium 10,6 vs Spain, 6,1)

Many developing countries show low grade of openness

Some comprehensive initiatives: the case of the European Union

European Commission incentivises investment in infrastructure in three ways:

- The creation of a public pipeline of European infrastructure investment projects

- The creation of the Europe 2020 project bond initiative under the auspices of the EIB

- Encourages EIOPA to detail and harmonise the European Union's regulation of the pensions funds' investment in infrastructure

Will it be enough?

Data

The information of the database comes from several sources:

Group of variables	Database
Group 1 refers to the limits on pension funds' investment in several asset categories	OECD (2014a)
Group 2 review trends in the financial performance of pension funds	OECD (2014c)
Group 3 is formed by the remaining variables, associated with financial market performance, legislation and regulation topics	World Economic Forum USA (2012)

Dependent variable: the investment of pension funds in infrastructure (as a % of total investments)   OECD (2014b)

Econometric strategy: the Tobit model

Econometric approach:

- Censoring problem: The dependent variable is observed only over some interval of its support

- The investment of pension funds in infrastructure as a % of total investments) belongs to the interval [0,100]

- The sample is a mixture of observations with zero and positive values

- The use of classical econometric methods (e.g. Ordinary Least Squares estimation) produces unfair estimates

- The likelihood function has to take into account this particularity and involves additional computational complications. The Tobit model controls for this censoring problem

The empirical evidence of the limiting factors in the investment in infrastructure by pension funds

Determinants of investment in infrastructure (a Tobit estimation)

Dependent variable: Total Infrastructure investment (as a % of total investments)				
	Model 1	Model 2	Model 3	Model 4
Portfolio limit in domestic asset categories	2.577 **	-1,731	-2,791	-4,846
Portfolio limit in foreign asset categories	-0,399	-2.342 *	-4.660 **	-4,928
Capital account liberalization		6.395 **	12.872 ***	49.606 **
Quality of overall infrastructure		-5,955	-19.497 **	-65.177 **
Importance of pension funds relative to the size of the economy in the OECD		0.193 *	0,09	-0,073
DB pension plans' assets as a % of total assets		0,04	0,01	0.386 **
Strength of legal rights index		4.241 *	4.841 **	15.035 **
Strength of investor protection index		-5.960 *	-11.725 ***	-38.669 **
Number of procedures to enforce a contract		-0,227	-1,615	-5.546 **
Financial strengths indicator			9.000 **	32.405 **
Non-financial corporate bonds to total bonds and notes outstanding (%)			0.940 **	5.143 **
Share of total number of securitization deals			0.340 *	2.139 **
Anglosphere countries (broad version)				47,65
EU countries				140.591 **
EFTA countries				90.244 *
Latin-American and Caribbean countries				94.610 ***
Constant	-33.142 ***	0,628	69,281	29,451
Number of observations	57	57	57	57
Pseudo R^2	0,018	0,088	0,147	0,225
Log pseudolikelihood	-80,655	-74,884	-70,026	-63,679

Local regulation

Structural variables

Rule of law

Financial mkts' performance

Geographic

The empirical evidence of the limiting factors in the investment in infrastructure by pension funds

Degree of regulatory openness

The openness regulatory indicator is shown as significant end positive in model 1. However, in models 2 and 3 this variable is no longer significant. **This could suggest that financial regulation (taken in an isolated way) could be a limiting factor**. However, if we take the other possible restrictive variables, regulation can move into the background as a problem

	Model 1	Model 2	Model 3	Model 4
Portfolio limit in domestic asset categories	2.577 **	-1,731	-2,791	-4,846
Portfolio limit in foreign asset categories	-0,399	-2.342 *	-4.660 **	-4,928
Capital account liberalization		6.395 **	12.872 ***	49.606 **

The empirical evidence of the limiting factors in the investment in infrastructure by pension funds

Structural variables and characteristics of the various pension systems

- The **quality of infrastructure** is significant and negative in models 3 and 4. This could be because a high degree of quality infrastructure could leave fewer investment opportunities in good projects to the private sector, and specifically to pension funds

- The **size of the funded pillar** shown significant positives in model 1. Perhaps a greater volume of managed assets justify finding alternative assets to reach higher yields.

- **Higher DB pensions systems is a significant positive in model 3.** This could be because in a low interest environment, DB pension funds are more likely to look for non-conventional assets such as infrastructures

Dependent variable: Total Infrastructure investment (as a % of total investments)				
	Model 1	Model 2	Model 3	Model 4
Quality of overall infrastructure		-5,955	-19.497 **	-65.177 **
Importance of pension funds relative to the size of the economy in the OECD		0.193 *	0,09	-0,073
DB pension plans' assets as a % of total assets		0,04	0,01	0.386 **

14

The empirical evidence of the limiting factors in the investment in infrastructure by pension funds

Rule of law

Strength of legal rights and strength of investor protection index are significant and positive in models 3, 4 and 5, while **the number of procedures to enforce a contract is a significant positive in model 5.** These results show the importance of the rule of law when pension funds decide to invest in infrastructure

Dependent variable: Total Infrastructure investment (as a % of total investments)				
	Model 1	Model 2	Model 3	Model 4
Strength of legal rights index		4.241 *	4.841 **	15.035 **
Strength of investor protection index		-5.960 *	-11.725 ***	-38.669 **
Number of procedures to enforce a contract		-0,227	-1,615	-5.546 **

The empirical evidence of the limiting factors in the investment in infrastructure by pension funds

Financial markets performance

Other proxy variables that shows the **performance of the local financial market** such as the case of the financial strengths indicator, the percentage of non-financial corporate bonds to total bonds or the share of total number of securitisation deals, **are significant and positive in models 3 and 4**

Dependent variable: Total Infrastructure investment (as a % of total investments)				
	Model 1	Model 2	Model 3	Model 4
Financial strengths indicator			9.000 **	32.405 **
Non-financial corporate bonds to total bonds and notes outstanding (%)			0.940 **	5.143 **
Share of total number of securitization deals			0.340 *	2.139 **

The empirical evidence of the limiting factors in the investment in infrastructure by pension funds

Geographic

Geographical dummys for European and Latin American countries are significant and positive. Surprisingly, they are not significant for Anglosphere countries

Dependent variable: Total Infrastructure investment (as a % of total investments)				
	Model 1	Model 2	Model 3	Model 4
Anglosphere countries (broad version)				47,65
EU countries				140.591 **
EFTA countries				90.244 *
Latin-American and Caribbean countries				94.610 ***

Conclusions

- **Strong incentives for pension funds' participation** in infrastructure financing, in a far more intensive way than they have done previously. However, the investment level in general is low, and only few countries such as Canada and Australia hold significant portfolios.

- We are in a context in important **regulatory changes** affecting pension funds. **How important is this issue?** Regulation is **extremely diverse across countries**. There are some which have few or no restrictions on investment (Belgium, Canada, Australia, etc.), and others that either do not permit it or impose significant restrictions.

- In this paper **we ask whether the current regulatory framework is the main impediment to pension funds' investment in infrastructure.**

- The **empirical evidence shows that regulation itself may be important, but if we introduce other variables the regulatory factor becomes less significant.**

- **Other variables such as the structure of pension systems and others linked to the project finance such as the rule of law, financial performance etc. are becoming more important right at the moment.**

Factors that impact on pension fund investments in infrastructure under the current global financial regulation

Javier Alonso, Alfonso Arellano and David Tuesta

Implications of the New Regulatory Order for Retirement System Risk Management

The Wharton School. University of Pennsylvania
April 29/30, 2015

Econometric strategy: the Tobit model

Description

There is a database of N observations (pension funds).
There is a dependent variable y_i ($i = 1,\ldots,N$) and K exogenous variables
(regressors) x_{ki} ($i = 1,\ldots,N; k = 1,\ldots,K$).

The dependent variable is censored: We observe y_i but the true variable is y^*_i
(latent variable)

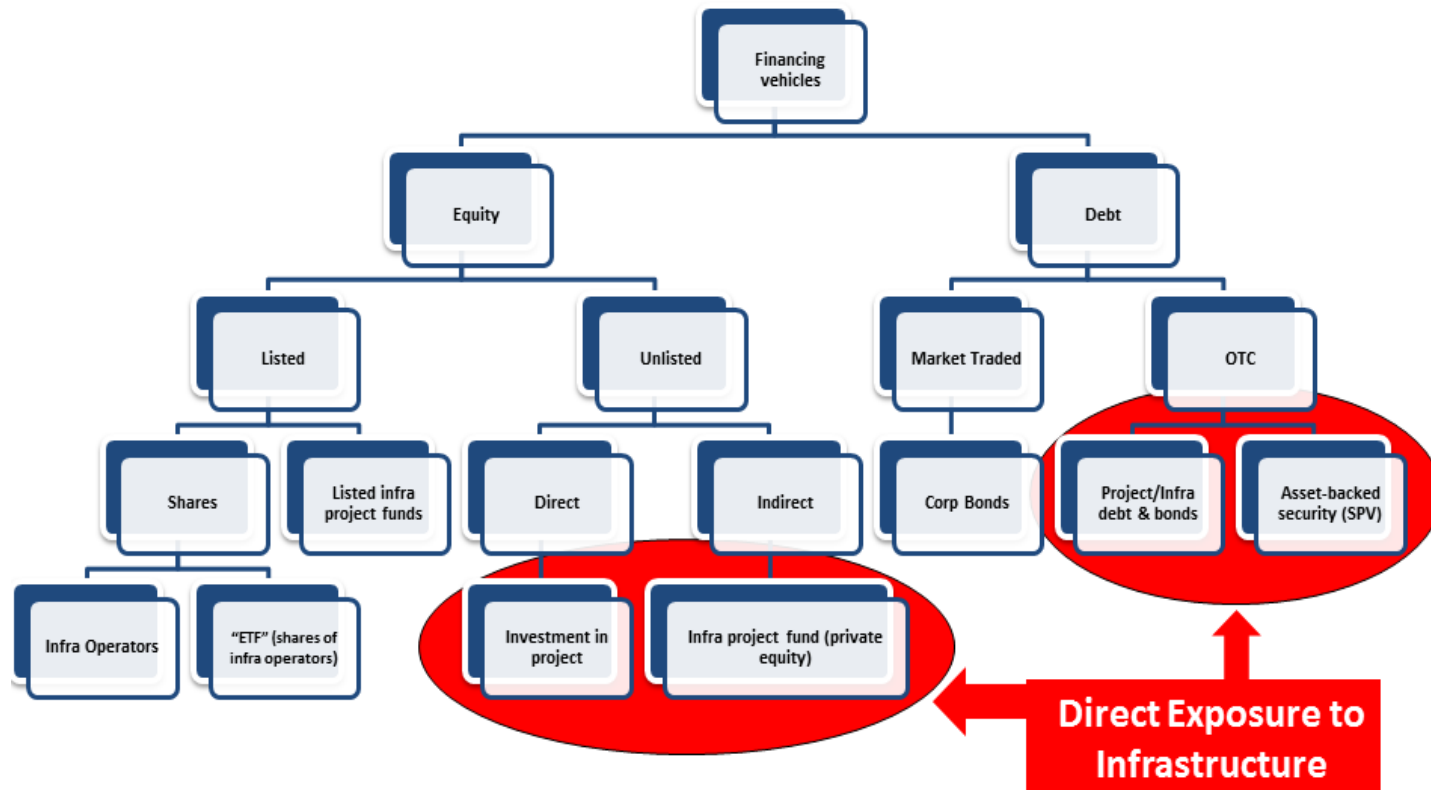$y_i = y^*_i$ if $y^*_i > 0$
$y_i = 0$ if $y^*_i \leq 0$

$$y^*_I = \beta_0 + \beta_1 x_{1i} + \ldots + \beta_K x_{Ki} + u_i \quad , \text{ where } u_i \sim N(0,\sigma^2), \; i = 1,\ldots,N$$

The estimation process is controlled by the country: the clustered sandwich
estimator is applied, using the country as cluster variable

Pension funds and their investments in infrastructure; regulation issues

Big complexity in the different possibilities of infrastructure financing and its regulation

Each infrastructure needs its specific project finance

Source: OECD A Taxonomy of Instruments and Incentives to attract Institutional Investors in long-term infrastructure investments

Pension funds and their investments in infrastructure

More to take into account: risks and coverage

Construction
- Delays:
  – Loss of concession
  – Rupture of the contract
- Extra costs
- Technical failures

Operational
- Insufficient production
- Increase in costs
- Quality of the product

Supply contract
- Deficit of supply
- Interruptions
- Price of supply

Markets
- Demand
- Price
- Delays in payments

Others
- Force majeure
- Environment

Financial Markets
- Rates of return
- Currencies

Politics
- Expropriations
- Political turmoil
- Regulation

SPV

Construction contract / sponsors

Operational contract

Sales contact / Independent expert

Supply contract

Financial contracts/ Derivatives

Insurance/ Other contracts

Source: BBVA Research 22