

Investment Behaviour of Pension Funds

IOPS Secretariat

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1. Background

- In 2017 Jamaica meeting, IOPS members discussed some empirical research on pension funds' investment behaviour and their role in financial markets' stability
- Previous studies seem to indicate that pension funds tend to have countercyclical investment behaviour contributing to more stable prices in the market during substantial price changes
 - However, the existing quantitative research is fragmented in terms of data coverage and methodology
- Therefore IOPS members decided to replicate the study done by Italian pension regulator (COVIP) to gather some empirical evidence on the investment behaviour of pension funds in selected jurisdictions

2. Scope and data

- Participants: Chile, Italy, Mexico and Poland
- Basic Information of the data
 - Asset classes: Cash and deposits, Public bonds, Private bonds, Equity, and Others
 - **Data type**: Pension funds investments (incl. **purchases** and **sales**), Cash flows, Market variables
 - **Sample periods**: From 2006.Q1 until 2016.Q4 (quarterly basis)
- → The data received were valuable for investigating the pension funds' investment behaviour as such a detailed information set on purchase and selling by asset classes is rare



→ By distinguishing "Net new investments" and "Change in value", we can identify the investment behaviour of pension funds

More specifically, by comparing these two factors, we can see whether pension funds **(de)stabilise the market**

1) Definition of "counter-cyclical" & "pro-cyclical"

- Definition1: Counter-cyclical: Buying (selling) assets in a falling (rising) market. Pro-cyclical - the opposite.
 - Such strategies could stabilise (exacerbate) price movements in financial markets (c.f. Blake et al., 2015: 20)



1) Definition of "counter-cyclical" & "pro-cyclical"

- Definition2: Changing fund's propensity for buying (selling) to adjust to the changing market conditions
 - Example: In a rising market a fund may continue purchasing a particular class of assets, however may decide, as compared to the previous periods, to decrease the relative size of its net purchases (sales)



2) Classification of four sub-periods has been changed:

In previous paper

In current paper

Definition	Periods	Definition	Periods
Before crisis	Q1.2006 - Q4.2007	Pre-crisis	Q1.2006 - Q2.2007
1 st stage of crisis	Q1.2008 – Q1.2009	Crisis	Q3.2007 – Q1.2009
2 nd stage of crisis	Q2.2009 - Q4.2010	Recovery	Q2.2009 - Q4.2010
After crisis	2010 - 2016	Post-crisis	2010 - 2016

2) Classification of four sub-periods

2.1) Equity prices

Movement of MSCI International World Index Price



2) Classification of four sub-periods

3500

3000 2500

2000 1500

2006 4Q 2007 1Q 2007 2Q 2007 3Q

007 4Q

2008 1Q 2008 2Q 2008 3Q

2008 4Q 2009 1Q 2009 2Q 2009 3Q

2006 1Q 2006 2Q 2006 3Q

Chile



2010 2Q

2010 3Q 2010 4Q 2011 1Q

2009 4Q 2010 1Q 2011 2Q 2011 3Q 2011 4Q

2012 1Q 2012 2Q 2012 3Q 2012 4Q 2013 1Q 2013 2Q 2013 3Q 2016 1Q 2016 2Q 2016 3Q 2016 4Q

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2015 4Q 2016 1Q 2016 2016 2016

* IPSA index, end of quarter

2013 4Q 2014 1Q 2014 2Q 2014 3Q

2014 4Q 2015 1Q 2015 2Q 2015 3Q 2015 4Q

2) Classification of four sub-periods 2.1) Equity prices



2) Classification of four sub-periods

2.2) Bond yields

10-Year High Quality Market (HQM) Corporate Spot Rate



Source: U.S. Department of the Treasury retrieved from FRED, Federal Reserve Bank of St. Louis

2) Classification of four sub-periods

2.2) Bond yields



2) Classification of four sub-periods 2.2) Bond yields



3) Pension funds' investment behaviour in equity markets 3.1) % of net purchases of equity in total new investments

Jurisc	liction	Pre-	crisis	Cri	sis	Recovery		Post-crisis	
		∆Price	Purchase	∆Price	Purchase	∆Price	Purchase	∆Price	Purchase
Movico	Domestic	-	-	-7.8%	13.9%	10.5%	12.4%	0.9%	3.8%
IVIEXICO	Foreign	-	-	-8.3%	-3.5%	7.6%	22.0%	3.3%	9.4%
Chilo	Domestic	10.2%	7.1%	-4.5%	-4.8%	10.5%	0.6%	-0.5%	1.4%
Chile	Foreign	2.5%	1.8%	-8.3%	11.3%	7.6%	10.5%	-0.5%	-2.5%
Poland	Domestic	11.0%	4.4%	-13.2%	30.9%	10.8%	49.9%	1.0%	40.9%
	Foreign	2.5%	0.8%	-8.3%	0.4%	7.6%	0.9%	1.0%	3.4%
lt	aly	2.5%	11.5%	-8.3%	30.6%	7.6%	15.6%	3.3%	11.9%

3) Pension funds' investment behaviour in equity markets 3.2) Summary

Jurisdiction	Domestic equities		Foreign equities		Behaviour during all four periods	
	crisis	recovery	crisis	recovery	(pre-crisis, crisis, recover, post-crisis)	
Mexico	-	+	+	+	net buyers of domestic equities*	
Chile	+	(+)	-	+		
Poland	-	+	(-)	(+)	net buyers of domestic and foreign equities	
Italy	n/a	n/a	-	+	net buyers of foreign equities**	

+ : pro-cyclical investment behaviour

- : counter-cyclical investment behaviour

() : weak effect with negligible average quarterly net investments (< 1% of total quarterly new investments) n/a : no data on domestic equities for Italy

*: no data on pre-crisis period for Mexico, **: most equity investment in Italy related to foreign equities

4) Correlation analysis (net purchases of domestic equity vs. stock index returns)

- Result indicate counter-cyclical behaviour for Poland and Italy
 - Strong negative correlation within a statistically significant level at 5%

J	urisdiction	Over	all	Pre-cri	sis	Crisi	s	Recov	ery	Post-cr	risis
		Coefficients	P-value								
	Mexico	2.1%	0.9021	N/A	N/A	26.2%	0.6708	21.3%	0.6458	-8.9%	0.6791
	Chile	22.9%	0.1356	-6.1%	0.9080	-14.2%	0.7608	20.6%	0.6578	10.0%	0.6432
	Poland	-43.6%	0.0125	5.3%	0.9204	-70.1%	0.0793	-90.5%	0.0051	-40.8%	0.1875
	Italy	-42.8%	0.0091	-33.7%	0.5134	-74.7%	0.0537	-52.6%	0.2255	20.5%	0.4456

5) Regression analysis (Y: net purchase of domestic equity, X: stock index returns)

- Result indicate counter-cyclical behaviour for Poland and Italy (foreign)
 - Negative coefficient within a statistically significant level at 5%

Evolapatory	Mexico	Poland	Chile	Italy	
variables	Coefficient	Coefficient	Coefficient	Coefficient	
	(p-value)	(p-value)	(p-value)	(p-value)	
Intercept	-0.0039	0.0671	-0.0549	0.0974	
	(0.9831)	(0.7463)	(0.7564)	(0.5475)	
Stock index	0.2474	-3.5341 *	2.6585	-5.5670 *	
returns	(0.8822)	(0.0009)	(0.1027)	(0.0222)	
R-squared	0.0005	0.1904	0.0522	0.1835	
#observations	36	32	44	36	

6) Institutional determinants of pension funds' investment behaviour

- The institutional framework in a jurisdiction can have a significant impact on the way pension funds invest
 - Benchmarks (case of Italy and until recently Poland)
 - Investment penalties for underperformance (case of Chile and until recently Poland)
 - Freedom of members to switch between different pension providers and investment portfolios (case of Chile and Mexico)

→ Investment behaviour of pension funds can be the result of mixture of different institutional determinants in each jurisdictions

5. Conclusions

- Since only four countries are covered in the study, the applicability of its findings to other pension systems may be limited
- The analysis of **transactions** in **equities** suggests that
 - Polish and Italian funds tended to act counter-cyclically when purchasing equities (domestic Poland, foreign Italy)
 - There is some evidence showing that **Chilean funds** may have acted **procyclically** in **domestic equity market**
- The correlation and regression analysis of domestic equity transactions suggests that
 - **Polish** and **Italian funds** have a **counter-cyclical behaviour** during the whole horizon for which the data was available

5. Conclusions

- Investment behaviour might be influenced not only by their strategic decisions but by factors that are related to the institutional framework
 - Italian and Polish pension funds were influenced in their decisions by the presence of **strategic asset allocation benchmarks**
 - The data for Chile and Mexico cover all types of investment portfolios (so-called multifundos)
 - ✓ Possible allocation changes between portfolios over time as a result of members' reactions to price changes
 - ✓ The overall demand for risky and safe assets may be driven by the gradual maturing of these pension systems

5. Conclusions

- From the perspective of stability of financial markets and individual pension fund members,
 - It seems desirable to set up **strategic asset allocation benchmarks** in the system and impose **requirements for managing tracking errors**
 - These should **prevent pension fund managers** from the **risk** that occurs when deviating too far from the long-term investment policy by **not reacting to continued and substantial asset changes**
 - Such a proposal may help induce managers to **sell** (buy) **highly appreciating** (depreciating) **assets** when the current investment allocation **deviates too far** from the assumed long-term one

6. In the next draft we intent to..

- Analyze the data for multifunds (most aggressive and most conservative) in Chile and Mexico; this could be helpful especially for the correlation and regression analyses
- Undertake additional analysis of the situation in bonds' markets (credit spread)
- Provide more discussion on institutional framework and its possible impact on pension funds investment behaviour

Pension funds' investment behaviour in equity markets

- Net purchases of equity compared to the price movements



Pension funds' investment behaviour in equity markets

- Net purchases of equity compared to the price movements

<u>Mexico</u>

X : Change in value of domestic equity as an proxy of price movements





Pension funds' investment behaviour in equity markets

- Net purchases of equity compared to the price movements

<u>Chile</u>

- X : Change in value of domestic equity as an proxy of price movements
- Y : Net purchase of domestic equity



Pension funds' investment behaviour in equity markets

- Net purchases of equity compared to the price movements

Poland

X : Change in value of domestic equity as an proxy of price movements

-2,000



2012 4Q

2012 1Q

2011 4Q

2009 4Q

2010 1Q

2009 3Q

2010 3Q

2010 4Q 2011 1Q

2011

Pension funds' investment behaviour in equity markets

- Net purchases of equity compared to the price movements

<u>Italy</u>

- X : Change in value of equity as an proxy of price movements
- Y : Net purchase of equity



Thank you!

