DO PENSION FUNDS MANAGE CASH EFFICIENTLY?

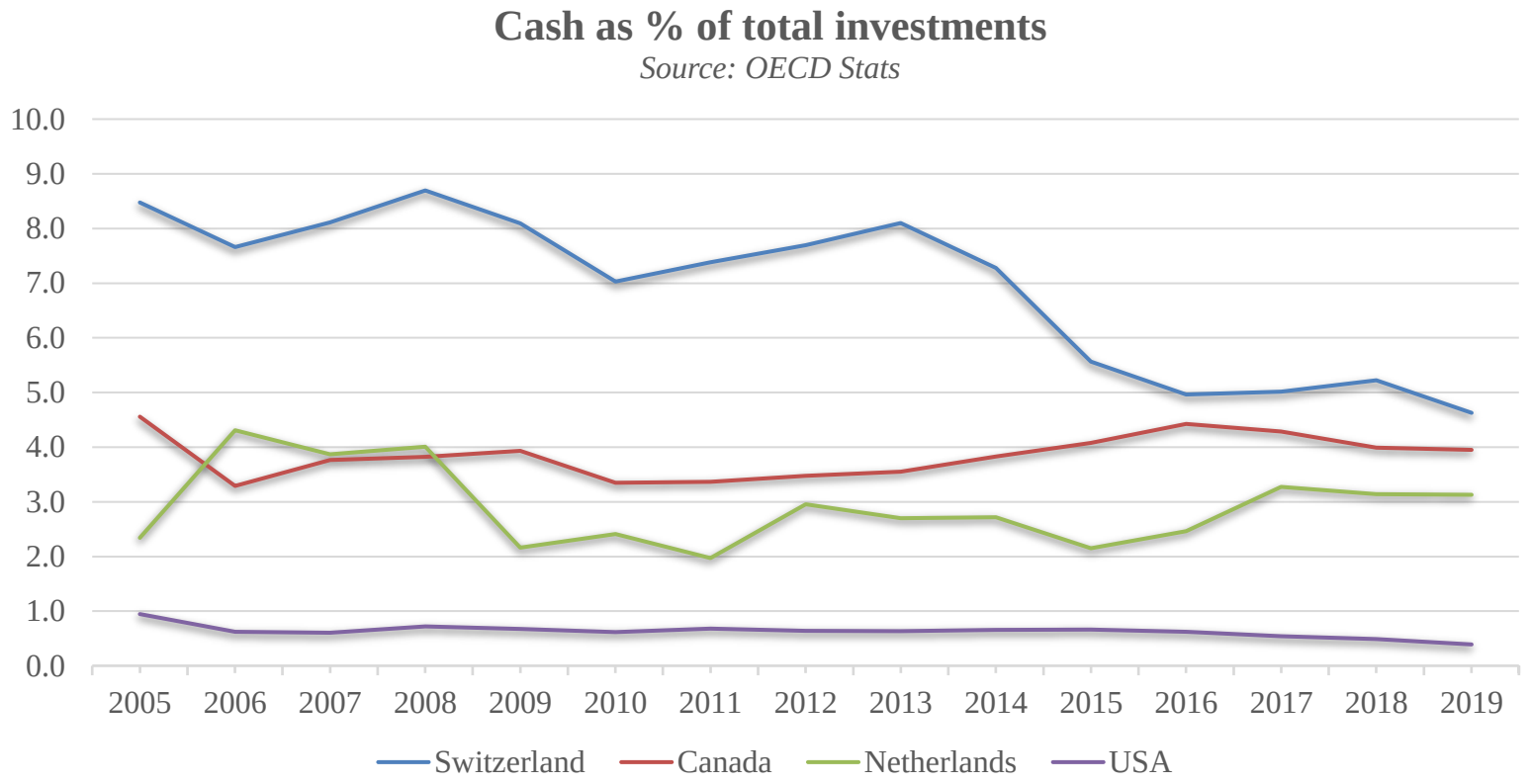
Hasa, S., and Salva, C., University of Neuchatel

RESEARCH QUESTIONS

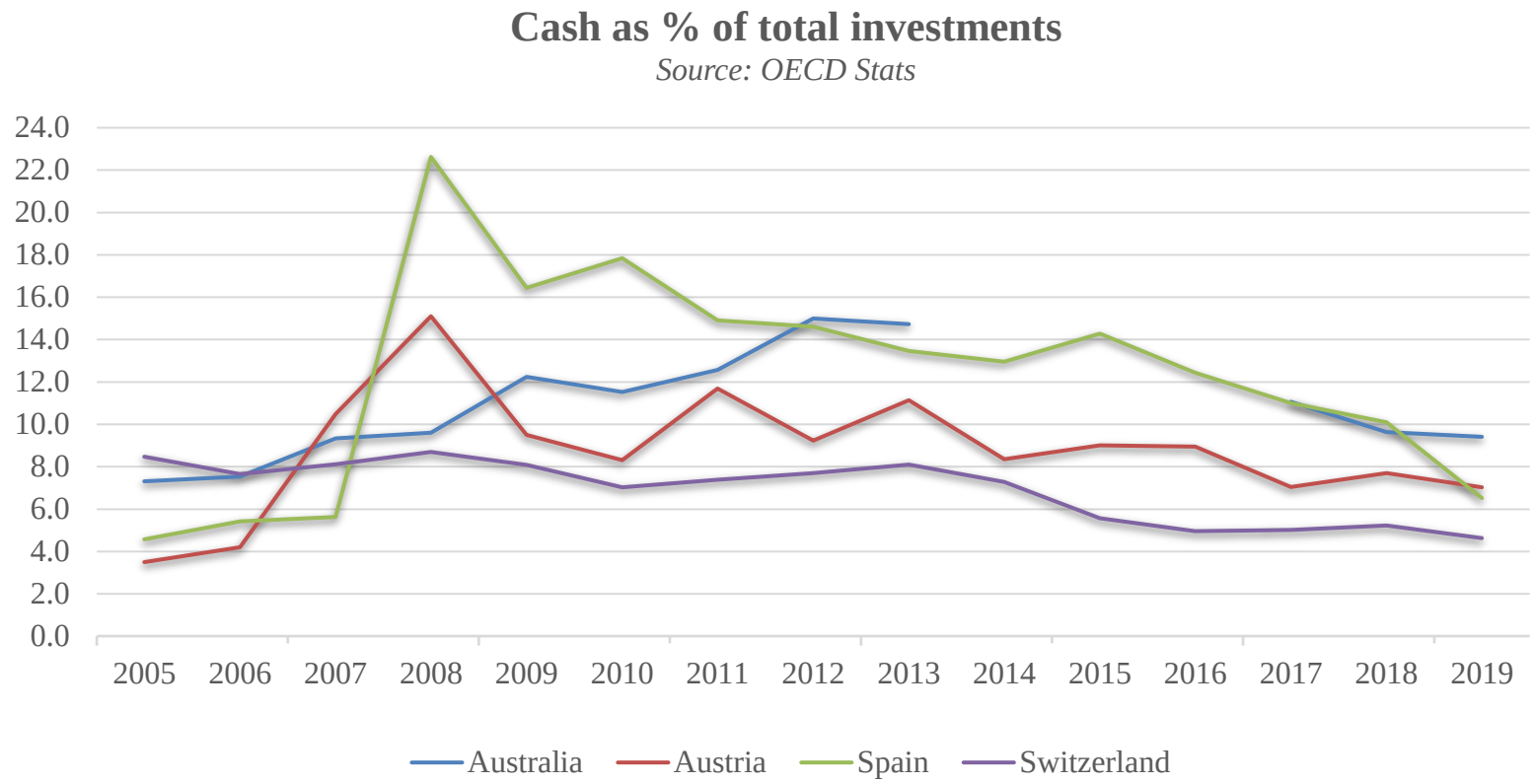
Why do pension funds hold cash?

Could some of the cash be reinvested into assets with a higher return?

MORE CASH IN SWISS FUNDS THAN IN SOME OTHER COUNTRIES

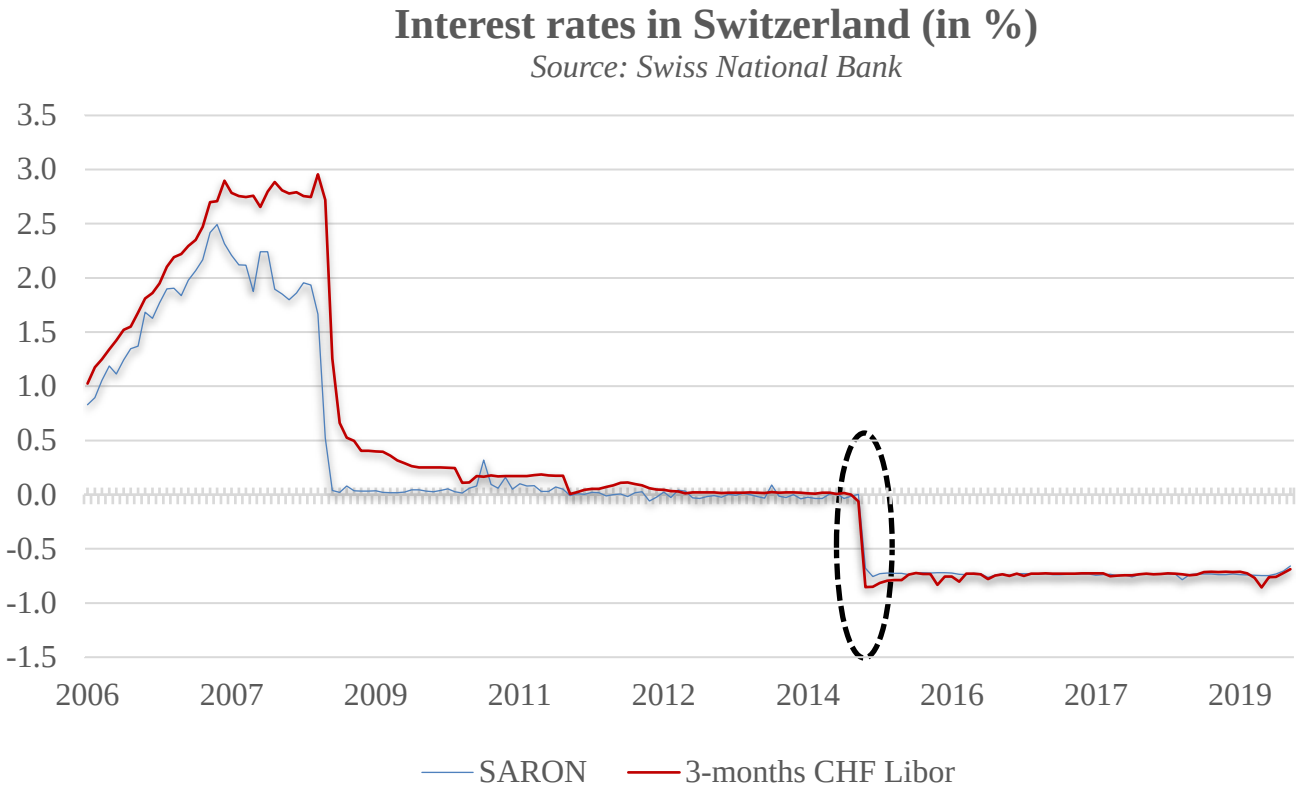


SOME COUNTRIES HAVE ALSO HIGH CASH



CASH IS COSTLY

- Cash earns a negative return



- Cash has an opportunity cost

CURRENT LITERATURE ON PENSION FUND CASH IS LIMITED

The portfolio management perspective

- As long-term investors, pension funds should avoid cash because there is reinvestment risk inherent

(see, e.g., Campbell and Viceira, 2000)

- As asset-liability investors, pension funds should hold no cash due to its negative correlation with liabilities

(see, e.g., Jondeau and Rockinger, 2014)

The operational perspective

- Pension funds should remain liquid to comply with pension payments and operating costs

(see, e.g., Broeders, Jansen, and Werker, 2017)

The managerial perspective

- Pension funds' cash holdings are associated with pension funds' governance

(see, e.g., Bregnard and Salva, 2018)

OUR STUDY HAS THEORETICAL AND PRACTICAL IMPLICATIONS

UNIVERSITÉ DE NEUCHÂTEL

Theoretical contribution

- Explore factors that drive pension fund cash allocations

Practical contribution

- Pension funds' investment management is a hot topic nowadays
- How pension funds manage cash has been overlooked despite its costs

=> Provide some guidance on how pension funds should decide on their cash policies to avoid undermining performance

IN SUM, WHAT WE OBTAIN

- A share of cash is held to comply with certain operational and investment needs
- Another share of cash is accumulated and slowly invested
- Large pension funds and pension funds in deccumulation phase respond better to their needs
- The introduction of negative rates triggered a decrease in cash
- Most of the variation in cash holdings is explained by permanent fund-specific factors rather than changes in pension fund needs (differences in technologies, managerial behaviour, competence in financial matters and/or organizational set ups)
- We estimate that 8.6% of assets is held in excess cash which if invested could increase performance by 30 bps

WE USE UNEXPRORED DATA ON SWISS PENSION FUNDS

UNIVERSITÉ DE NEUCHÂTEL

Pension fund data

- Provider: **Swiss Federal Statistical Office**
- Type of data: income statement, balance sheet, structural and admin. characteristics
- Time period: **2005-2018**

=> Unbalanced panel of **1,523** pension funds on average and **21,326** observations

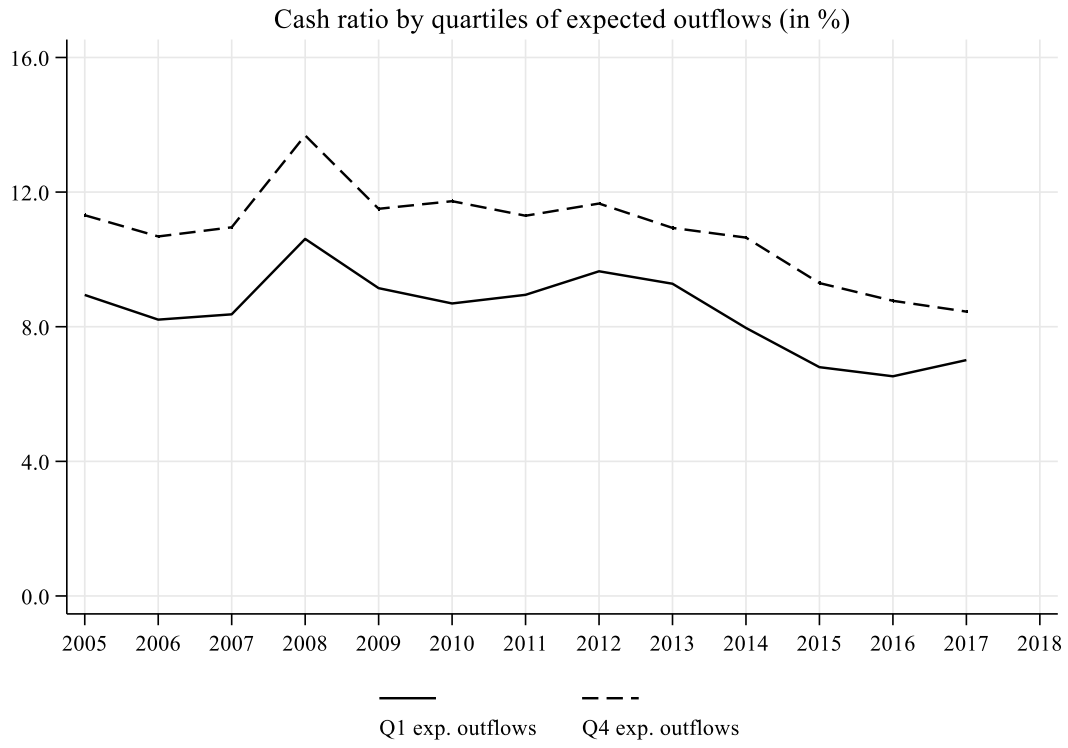
Market data

- EIKON**:** Swiss government bond yields
- Dimson, Marsh, Staunton, and Wilmot (2011-2018): World equity and bond premiums

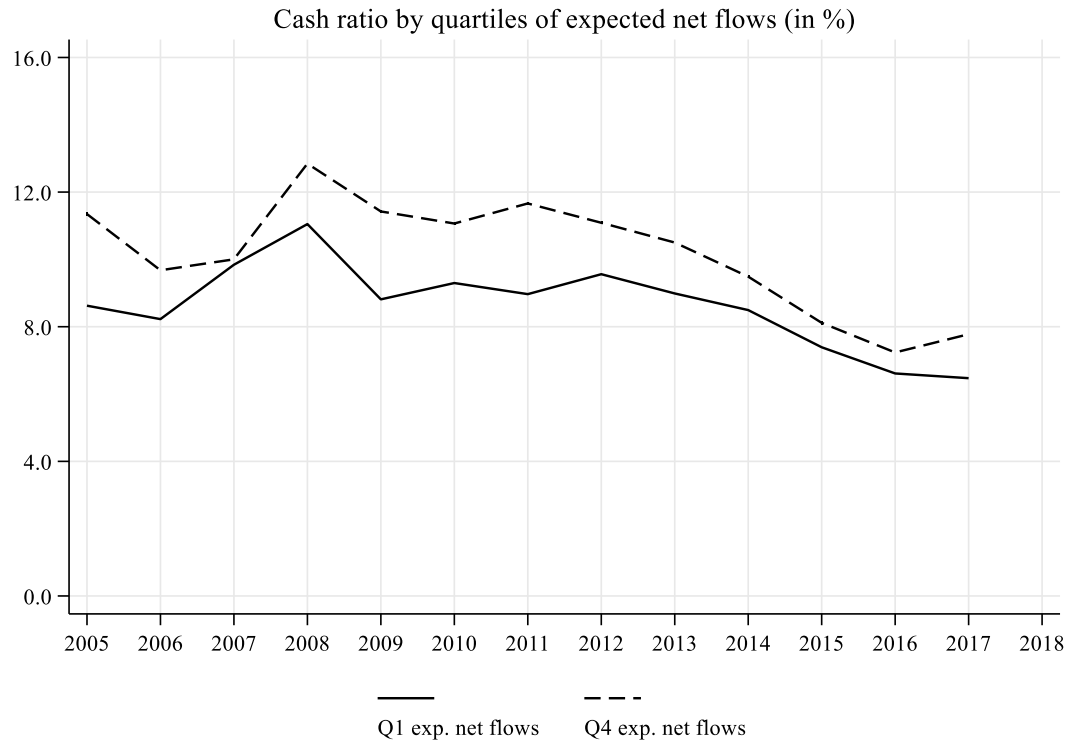
WHAT DRIVES THE NEED FOR HOLDING CASH?

Operating needs from regular activity

Higher expected outflows => more cash



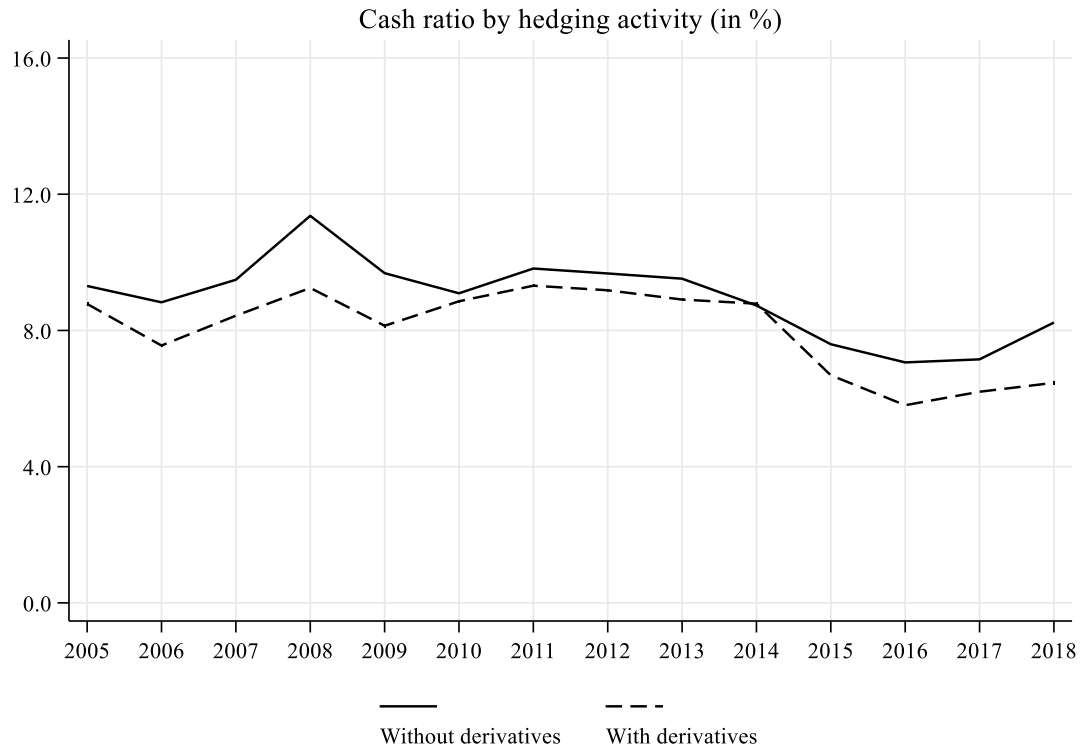
Higher expected net flows => less cash



WHAT DRIVES THE NEED FOR HOLDING CASH?

Operating needs from hedging activity

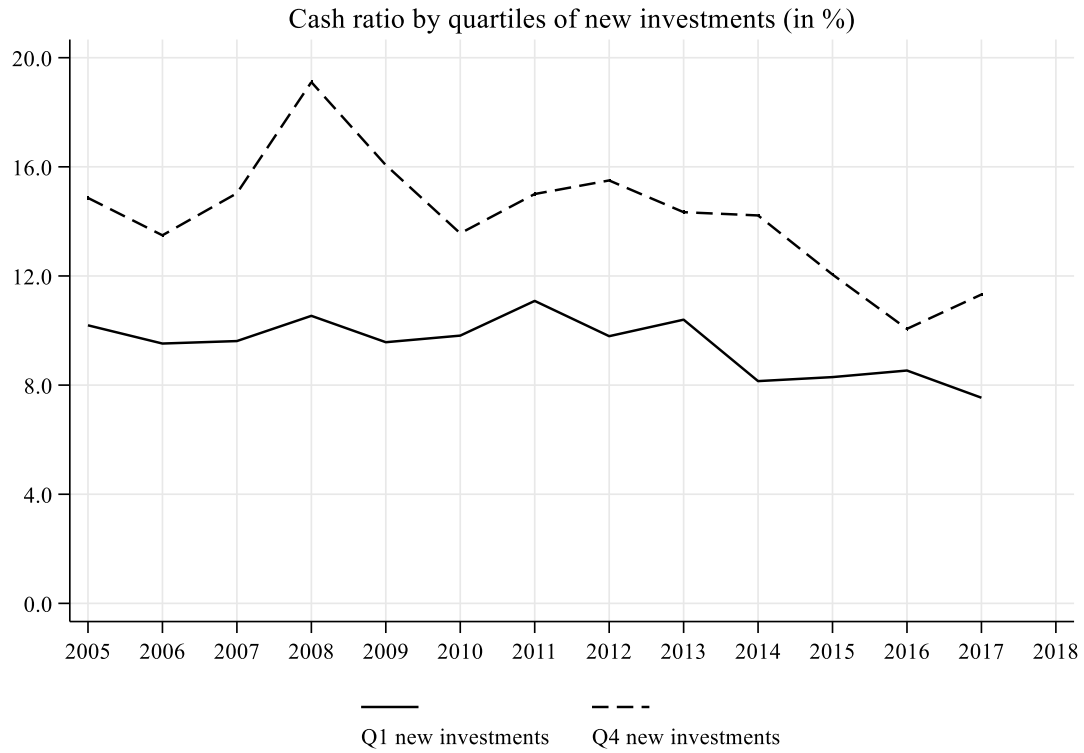
Hedging activities => more cash



WHAT DRIVES THE NEED FOR HOLDING CASH?

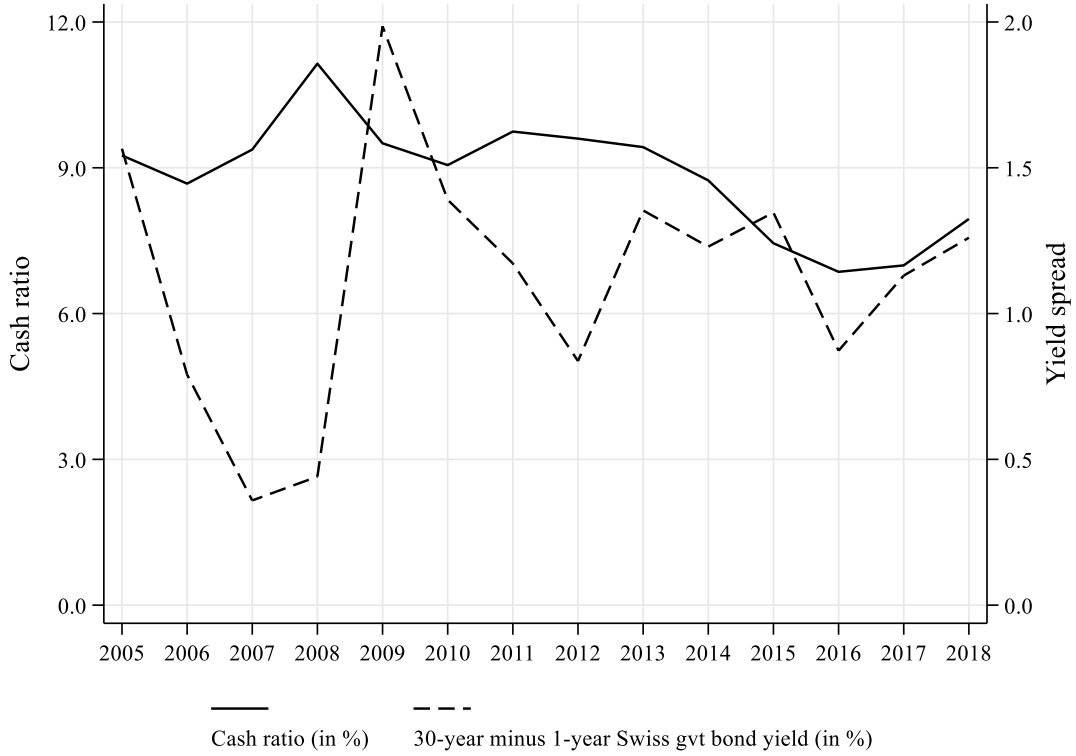
Investment needs

More upcoming investments made with cash
=> more cash



Opportunity cost of cash

Steeper yield curve => less cash



EMPIRICAL MODEL

$$Cash_{i,t} = \beta_0 + \beta_1 NetCF_{i,t+1} + \beta_2 EnVB_{i,t+1} + \beta_3 (ExVB + LS)_{i,t+1} + \beta_4 Texp_{i,t+1} + \beta_5 Derivatives_{i,t} + \beta_6 NewInv_{i,t+1} + \beta_7 YC_t + \Gamma' X_{i,t} + \eta_t + \varepsilon_{i,t}$$

$NetCF$ = total contributions - total annuity benefits (regular net contributions)

$EnVB$ = entry vested benefits

$ExVB$ = exit vested benefits

LS = benefits paid in the form of lump-sums

$Texp$ = total expenses

$Derivatives$ = dummy equal to 1 if the pension fund has derivatives

$NewInv$ = investments made with cash

YC = 30-year minus 1-year Swiss gvt bond yields, X = controls and η = year FE

WHY PENSION FUNDS HOLD CASH?

	(1) Cash		(2) Cash	
Regular net contributions $_{t+1}$	**0.206*** **			
	(0.062)			
Regular net contributions			**0.246*** **	
			(0.048)	
Entry VB $_{t+1}$	**-0.059** **		-0.028*	
	(0.027)		(0.015)	
Entry VB			**0.052** **	
			(0.026)	
Exit VB & Lump-sums $_{t+1}$	**0.093*** **	Operating needs	0.103***	
	(0.033)		(0.024)	
Exit VB & Lump-sums			-0.004	
			(0.020)	
Total expenses $_{t+1}$	**0.761*** **		0.388**	
	(0.160)		(0.163)	
Derivatives	-0.003		**0.012*** **	
	(0.003)		(0.003)	
New investments			**0.162*** **	→ Investment needs
			(0.011)	
30y-1y			**-0.003*** **	→ Opportunity cost
			(0.001)	
Total assets (ln)			-0.011***	
			(0.002)	
Funding ratio			-0.017***	
			(0.006)	
_cons	0.067***		0.208***	
	(0.004)		(0.022)	
Obs.	20106		20106	
R-squared	0.054		0.112	
Year FE	YES		NO	

WHEN PENSION FUNDS GET MORE EFFICIENT?

	(1) Accumulation phase	(2) Deccumulation phase	(3) Small funds	(4) Large funds	(5) Cash
Regular net contributions	**0.279*** **	**0.164**	**0.368*** **	**0.121** **	0.238***
	(0.070)	(0.125)	(0.079)	(0.052)	(0.049)
Entry VB $_{t+1}$	-0.021	-0.125	-0.037**	-0.044	-0.027*
	(0.016)	(0.077)	(0.016)	(0.038)	(0.015)
Entry VB	**0.056** **	**-0.056**	0.045	0.034	0.056**
	(0.027)	(0.127)	(0.033)	(0.039)	(0.026)
Exit VB & Lump-sums $_{t+1}$	**0.090*** **	**0.243*** **	**0.079*** **	**0.155*** **	0.100***
	(0.025)	(0.074)	(0.027)	(0.047)	(0.024)
Exit VB & Lump-sums	-0.007	-0.025	-0.016	0.017	-0.005
	(0.024)	(0.024)	(0.025)	(0.022)	(0.020)
Total expenses $_{t+1}$	**0.317***	**0.975***	**0.508*** **	**0.895*** **	0.398**
	(0.172)	(0.501)	(0.179)	(0.262)	(0.163)
Derivatives	0.011***	0.014***	**-0.001**	**0.005***	0.012***
	(0.004)	(0.005)	(0.006)	(0.003)	(0.003)
New investments	0.157***	0.181***	**0.132*** **	**0.265*** **	0.162***
	(0.012)	(0.029)	(0.012)	(0.027)	(0.011)
2015					**-0.012*** **
					(0.002)
2016					**-0.014*** **
					(0.002)
2017					**-0.010*** **
					(0.002)
Total assets (ln)	-0.011***	-0.008***			-0.010***
	(0.002)	(0.002)			(0.002)
Funding ratio	-0.019**	-0.004	-0.007	0.015	-0.016***
	(0.009)	(0.005)	(0.006)	(0.012)	(0.006)
_cons	0.206***	0.147***	0.077***	0.034**	0.201***
	(0.028)	(0.036)	(0.009)	(0.014)	(0.022)
Obs.	16351	3755	10050	10056	20106
R-squared	0.103	0.132	0.077	0.114	0.114
Year FE	YES	YES	YES	YES	NO

DO PENSION FUNDS ACCUMULATE CASH?

	(1) Cash	(2) Cash	(3) Cash	(4) Δcash
$Cash_{t-1}$	**0.751*** **	**0.584*** **		
	(0.022)	(0.020)		
$Cash_{t-2}$		**0.103*** **		
		(0.022)		
$Cash_{t-3}$		**0.090*** **		
		(0.018)		
$Cash_{t-4}$		**0.049*** **		
		(0.013)		
New investments			**0.147*** **	
			(0.014)	
New investments$_{t+2}$			**0.109*** **	
			(0.019)	
New investments$_{t+3}$			**0.069*** **	
			(0.018)	
New investments$_{t+4}$			**0.073** **	
			(0.029)	
Speed of adjustment				**0.260*** **
				(0.021)
Proxies for op. and inv. needs & control variables	YES	YES	YES	YES
Obs.	18085	12514	13716	18085
R-squared	0.591	0.627	0.174	0.141
Year FE	NO	NO	NO	NO

Current cash includes cash flows incurred up to 4 years before that are not yet invested

It takes up to 4 years for current cash to get invested

Pension funds adjust 26% of their cash towards a target level each year => it takes almost 4 years to reach their target

HOW PERSISTENT IS CASH?

	(1) cash	(2) cash	(3) cash
Initial cash	**0.470*** **	**0.455*** **	**0.453*** **
	(0.041)	(0.042)	(0.043)
Proxies for op. and inv. needs & control variables	NO	YES	YES
Obs.	19321	18101	18101
R-squared	0.244	0.315	0.306
Year FE	NO	Yes	NO

WHAT IS THE IMPACT OF UNOBSERVED MANAGERIAL FACTORS?

Variable	(1)	(2)	(3)	(4)	(5)
Pension fund FE	1.000		0.987		0.983
Year FE		1.000	0.013	0.112	0.011
Regular net contributions				0.102	0.000
Entry VB				0.001	0.002
Entry VB_{t+1}				0.010	0.000
Exit VB & Lump-sums				0.000	0.000
Exit VB & Lump-sums $_{t+1}$				0.048	0.003
Total expenses $_{t+1}$				0.171	0.001
Derivatives				0.001	0.000
New investments				0.553	0.066
R-squared	**0.573**	**0.011**	0.582	**0.095**	**0.654**

HOW MUCH OF THE CASH HELD IS EXCESS?

$$XCash_{i,t} = Cash_{i,t} - \widehat{Cash}_{i,t}$$

$Cash$ = actual cash

$\widehat{Cash}$ = estimated cash (3 definitions)

$XCash$ = excess cash

(in %)	Obs.	Mean	St.Dev	p5	p25	Median	p75	p95
Actual cash	7,915	16.50	12.55	7.08	9.46	12.52	18.51	40.52
Estimated normal cash 1	7,915	7.86	3.10	4.28	6.90	7.87	9.12	11.96
Excess cash 1	7,915	**8.64**	11.85	0.33	1.86	4.66	10.46	31.00

HOW MUCH PERFORMANCE IS LOST WITH EXCESS CASH?

Expected excess returns from:

- Dimson, Marsh, Staunton, and Wilmot (2011-2018)
- GASB No. 67 (see, e.g, Andonov and Rauh, 2018)

Apply weights and expected excess return on the fraction of cash recognized as excess

(in %)	N	Mean	St.Dev	p5	p25	Median	p75	p95
Dimson et al. (2011-2018), historical starting from 1900								
60% Bonds/40% Equities								
Cost of excess cash 1	7,915	**0.19**	0.26	0.01	0.04	0.10	0.23	0.69
GASB No. 67								
40% Bonds/20% Domestic equities/20% International equities/20% Real estate								
Cost of excess cash 1	7,915	**0.31**	0.43	0.01	0.07	0.17	0.38	1.12

DO PENSION FUNDS MANAGE CASH EFFICIENTLY?

UNIVERSITÉ DE NEUCHÂTEL

THANK YOU!!!