EMPIRICAL PENSION FINANCE ANALYSIS FOR PENSION SYSTEM ANALYSTS

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Fall 2015

INTRODUCTION

Financial risks

THE PERSPECTIVE OF THE PENSION SYSTEM ON FINANCIAL MARKETS

- Role and tasks of pension schemes
  - Support the management of financial risks of individuals (families) related to retirement and old age (surviving dependents, invalidity)
  - Retirement products are at the crossroads of societal values (social policy targets) and market imperatives
- Conclusion: Retirement products are different from financial instruments for pure wealth creation
  - More regulation is recommended

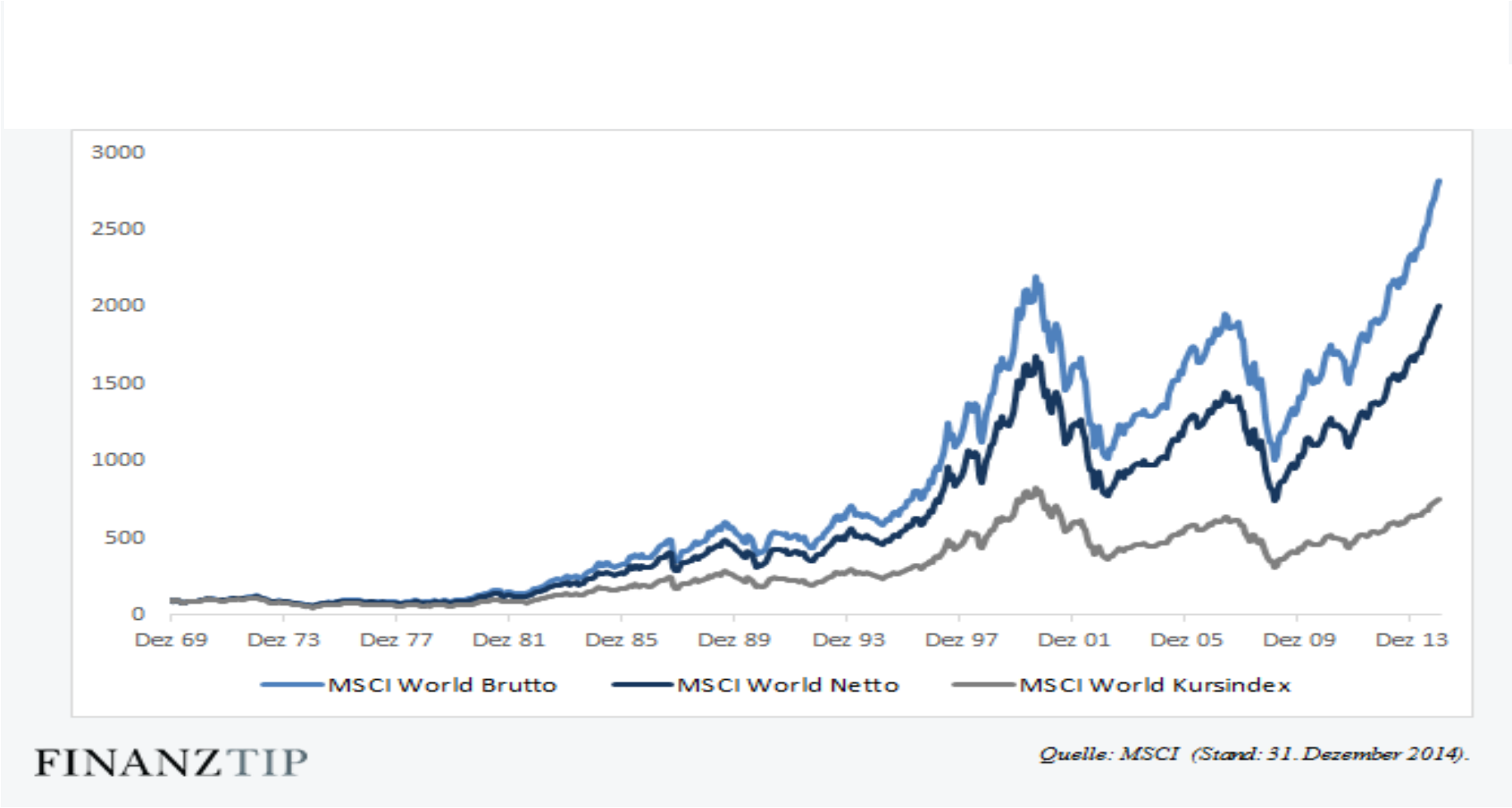
FINANCIAL MARKET RISK

1. Macro economic policy and rate of return risk
2. Commercial financial institutions: Rate of return and cost risks
3. Lack of financial literacy
4. Financial risk and the pay-out phase
5. Regulatory risk

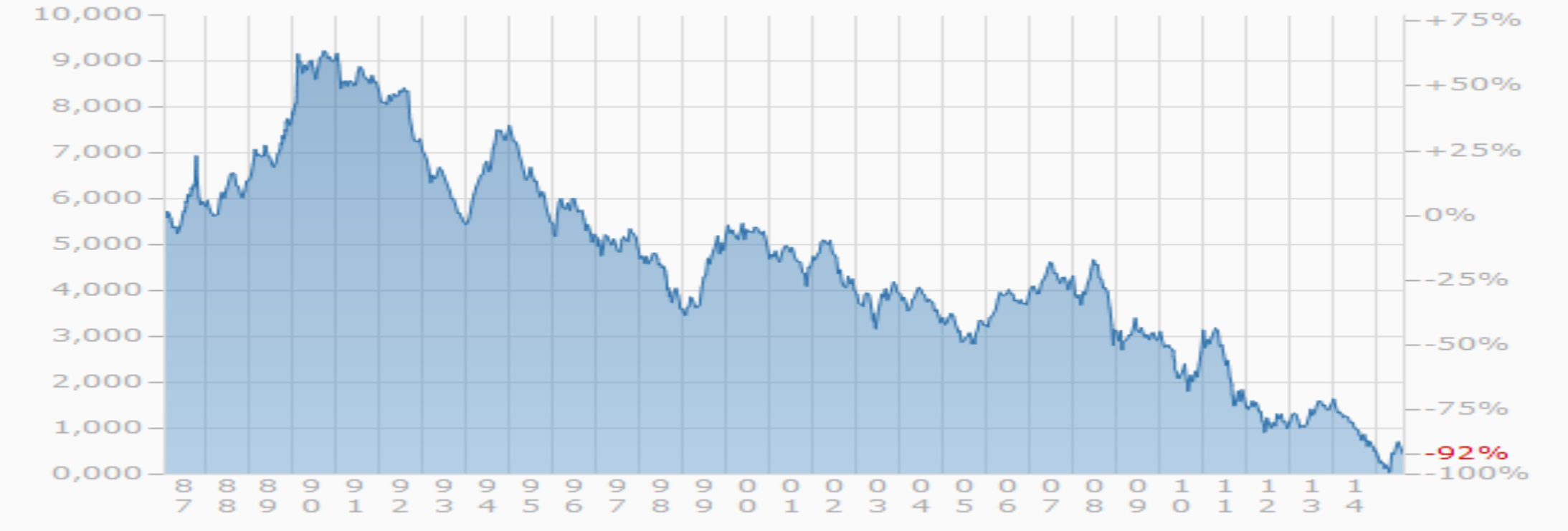
RETIREMENT SAVING IN A LOW RETURN ENVIRONMENT

Impact of low interest rates on required savings rates and savings periods (rate of return risk)

MSCI World:
Price index, Gross index, Net index



CURRENT YIELD ON BONDS OUTSTANDING



MODEL APPROACH (1)

Assumptions
Retirement saving of one percent of earnings W (T) each year for T years
Real earnings in the first year W (T=1) are set to 1.0; Real earnings rise by one percent each year.
Interest rate r

MODEL APPROACH (2)

Retirement Wealth	
Value of saving in period T saved in s ≤ T	V (s, T) = $.01 * (1.01)^{s} * (1 + r)^{(T-s)}$
Total value of retirement saving over a T period working career	R (T) = $\sum_{s=0,\,T-1} .01 * (1.01)^{s} * (1 + r)^{(T-s)}$
Wealth at retirement scaled by final earnings	F (T) = R (T) / W (T)

INTEREST RATE AND PENSION WEALTH (1)

Wealth-to-Earnings-Ratio at retirement from a savings rate of 1 percent, in percent

	Interest rate in percent					
Years	**6**	**5**	**4**	**3**	**2**	**1**
10	**12**	**12**	**11**	**11**	**10**	**10**
20	**33**	**30**	**27**	**24**	**22**	**20**
30	**65**	**56**	**47**	**40**	**35**	**30**
40	**118**	**94**	**75**	**60**	**49**	**40**

INTEREST RATE AND PENSION WEALTH (2)

Wealth-to-Earnings-Ratio at retirement from a savings rate of 2 percent, in percent

	Interest rate in percent					
Years	**6**	**5**	**4**	**3**	**2**	**1**
10	**25**	**24**	**23**	**22**	**21**	**20**
20	**65**	**59**	**54**	**48**	**44**	**40**
30	**131**	**111**	**95**	**81**	**69**	**60**
40	**236**	**188**	**150**	**120**	**98**	**80**

RESULTS

- At lower interest rates
  - an unchanged saving behaviour implies a lower pension,
  - a targeted pension requires
    - a higher savings rate,
    - or a longer savings period (e.g. higher retirement age),
    - or a shorter delivery period

- But: Savings capacity of individuals or households is limited.

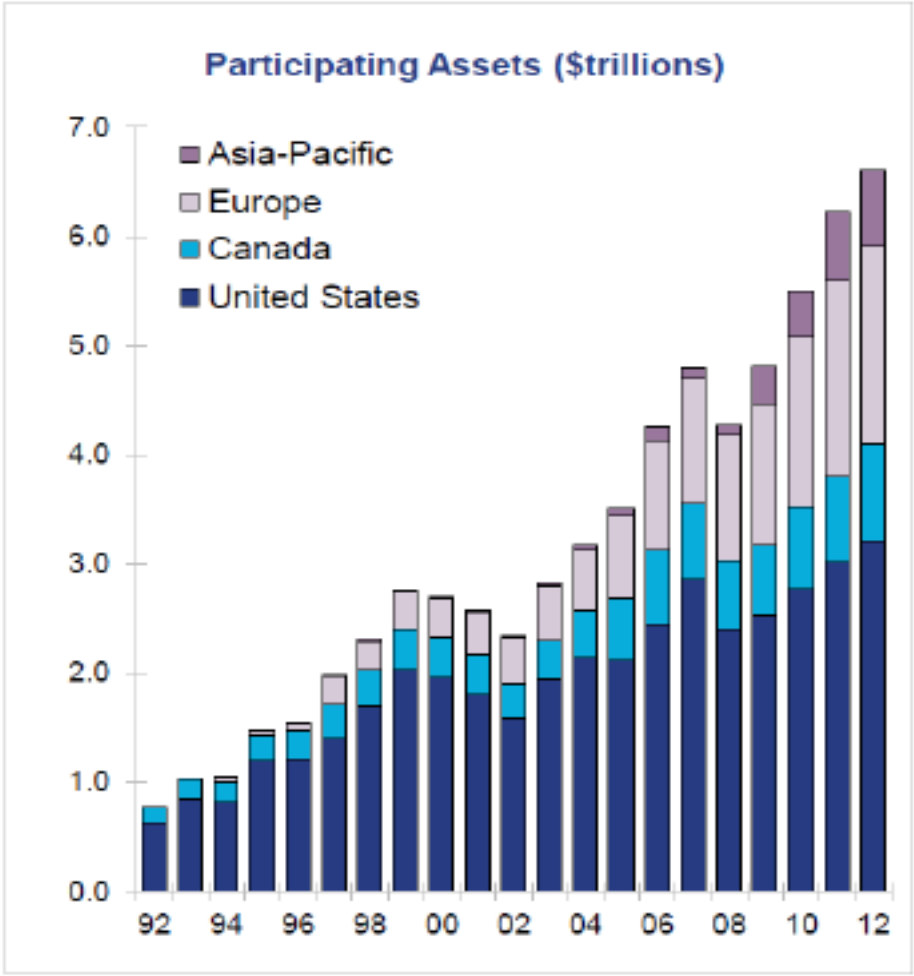
RISK RELATED TO FINANCIAL INSTITUTIONS

CEM GLOBAL INVESTMENT BENCHMARKING DATA BASE

- About 360 global funds with aggregate assets of almost $7 trillion USD participate. Included are DB funds, SWF's, buffer funds, and some DC asset management platforms.

- The database includes the following metrics:
  - Holdings
  - Policy/Reference Portfolio Weights
  - Fund & Asset Class Returns
  - Asset Class Benchmarks & Returns
  - Costs
  - Liability structure

- Benchmarking focus is:
  - What you paid
  - What you got
  - What you risked



GLOBAL PERFORMANCE RESULTS

- Policy returns (from asset mix) are by far the biggest component of total returns.
- Funds in the CEM database generated positive but modest net value added from active management.
- Costs include all investment costs except for transaction costs and performance fees for private market asset classes. New data from Dutch funds suggests that total investment costs for a 'typical' fund would be about 20 bps higher with these costs included.

Global / All Funds*

(22-year average, ending Dec. 31, 2012)

Total Return	9.56%
- Policy Return	9.00%
= Gross Value Added	0.56%
- Costs	0.41%
= Net Value Added	0.15%

* 22-year averages are the simple average of 22 annual averages. All fund observations within each year are included. Total # of annual fund observations is 6,351. Median fund size is $3.1B.

PRIVATE MARKET INVESTMENTS ARE EXPENSIVE

		Median Cost in basis points			
		Global Fixed Income	Global Stock	Real Estate	Private Equity*
Internal	Passive	--	5.1	n/a	n/a
	Active	3.3	7.8	27.3	34.4
External	Passive	7.1	5.5	n/a	n/a
	Active	29.0	49.2	75.0	165.0

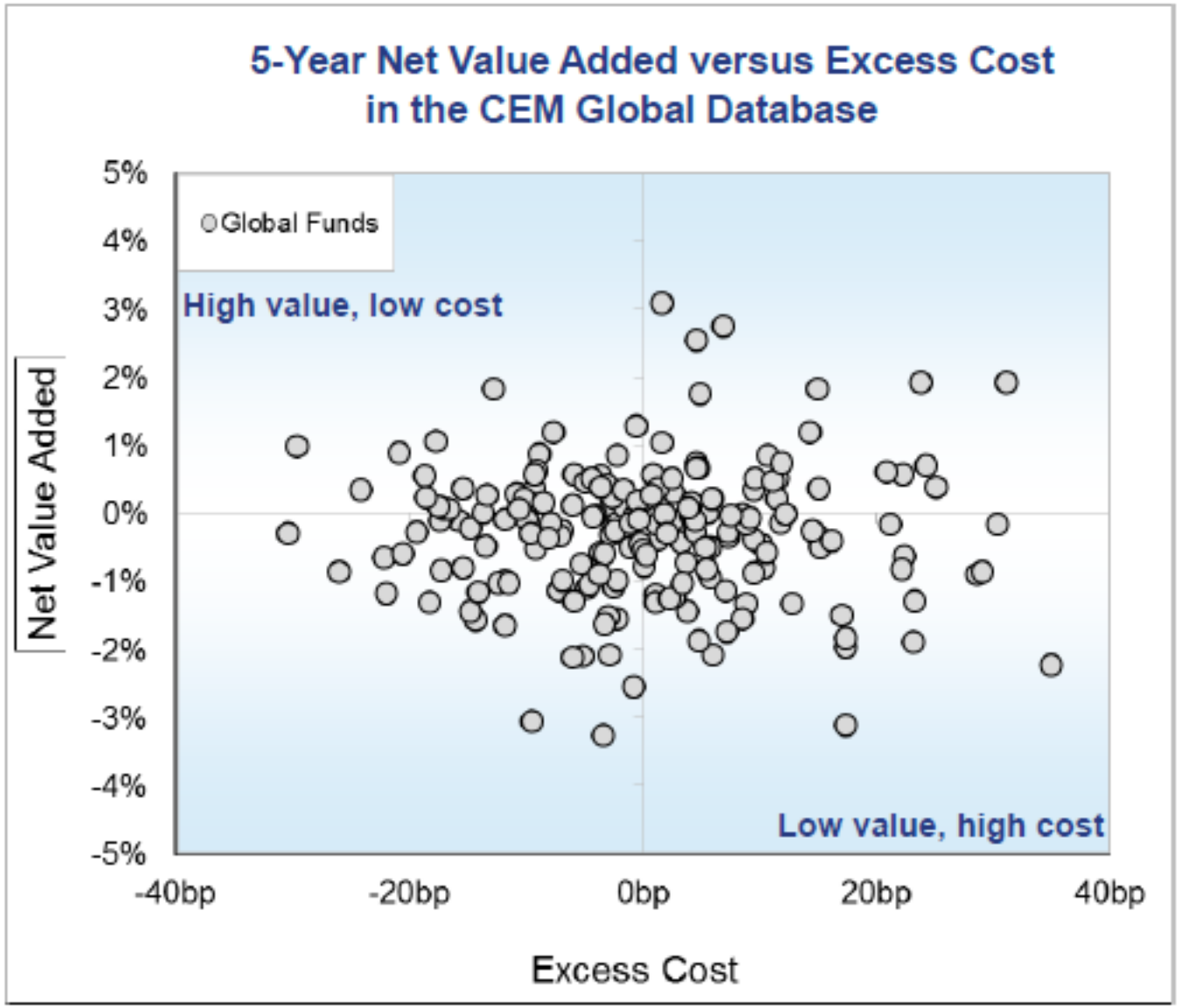
* Private equity costs include gross limited partnership fees and internal monitoring costs. Carry, plus transaction & other costs within LP's, are excluded. The asset base is 'amount fees are based on' rather than NAV.

EXTRA COST EXTERNAL FUND MANAGEMENT

		Median Cost in basis points			
		Global Fixed Income	Global Stock	Real Estate	Private Equity*
Internal	Passive	--	5.1	n/a	n/a
	Active	3.3	7.8	27.3	34.4
External	Passive	7.1	5.5	n/a	n/a
	Active	29.0	49.2	75.0	165.0
	FoFs			105.6	244.2

* Private equity costs include gross limited partnership fees and internal monitoring costs. Carry, plus transaction & other costs within LP's, are excluded. The asset base is 'amount fees are based on' rather than NAV.

If paying more got you more, the data should cluster from the bottom left to the top right in the cost effectiveness chart to the right. It does not. Paying more does not get you more.



FINANCIAL LITERACY

LUSARDI'S QUESTIONS ON FINANCIAL LITERACY (1 &2)

- Suppose you had $100 in a savings account and the interest rate was 2 percent per year. After 5 years, how much do you think you would have in the account if you left the money to grow: [**more than $102**; exactly $102; less than $102; do not know; refuse to answer.]

- Imagine that the interest rate on your savings account was 1 percent per year and inflation was 2 percent per year. After 1 year, would you be able to buy: [more than, exactly the same as, or **less than today** with the money in this account; do not know; refuse to answer.]

LUSARDI'S QUESTIONS ON FINANCIAL LITERACY (3)

- Do you think that the following statement is true or false? "Buying a single company stock usually provides a safer return than a stock mutual fund." [true; **false**; do not know; refuse to answer.]

INTERNATIONAL COMPARISON OF SURVEY RESULTS

Country	Year of data	Interest rate		Inflation		Risk Diversification		All 3 correct	At least 1 don't know	Number of Observations
		Correct	DK	Correct	DK	Correct	DK			
USA	2009	64.9%	13.5%	64.3%	14.2%	51.8%	33.7%	30.2%	42.4%	1,488
Netherlands	2010	84.8%	8.9%	76.9%	13.5%	51.9%	33.2%	44.8%	37.6%	1,665
Germany	2009	82.4%	11.0%	78.4%	17.0%	61.8%	32.3%	53.2%	37.0%	1,059
Japan	2010	70.5%	12.5%	58.8%	28.6%	39.5%	56.1%	27.0%	61.5%	5,268
Australia	2012	83.1%	6.4%	69.3%	13.0%	54.7%	37.6%	42.7%	41.3%	1,024
N. Zealand	2009	86.0%	4.0%	81.0%	5.0%	27.0%	2.0%*	24.0%*	7.0%	850
Switzerland	2011	79.3%	2.8%*	78.4%	4.2%*	73.5%*	13.0%*	50.1%*	16.9%*	1,500
Italy	2007	40.0%*	28.2%*	59.3%*	30.7%*	52.2%*	33.7%*	24.9%*	44.9%*	3,992
Sweden	2010	35.2%*	15.6%*	59.5%	16.5%	68.4%	18.4%	21.4%*	34.7%*	1,302
France	2011	48.0%*	11.5%*	61.2%	21.3%	66.8%*	14.6*	30.9%*	33.4%*	3,616
Russia	2009	36.3%*	32.9%*	50.8%*	26.1%*	12.8%*	35.4%*	3.7%*	53.7%*	1,366
Romania	2011	41.3%	34.4%	31.8%*	40.4%*	14.7%	63.5%	3.8%*	75.5%*	1,030

CONCLUSION

- Private markets are not a panacea. Implementation matters; because cost matters. **Low cost implementation is a key performance indicator**.
- The traditional **open pension fund competition model** is wrong. Pension funds compete on returns and individuals. The focus is on short-term returns, not on strategic asset allocation.
- It may take decades before the **financial education** achieves minimum standards for the average citizen to take informed long-term investment decisions. Therefore it is important to establish independent counselling services aside with the institutions implementing the fully funded pension pillar.

FINANCIAL RISK AND THE PAYOUT PHASE

FINANCIAL RISK DURING THE PAY-OUT PHASE

	Financial risk
Liquidity	Flexibility to meet unforeseen expenditures, e.g. medical treatment, long-term care
Adequate income	Alleviate poverty, provide adequate replacement of earnings
Life-long income	Longevity risk
Common risk	Inflation
	(Re-)Investment risk
	Bequests (?)

TYPES OF PRODUCTS FOR THE PAY-OUT PHASE

OBJECTIVE	TYPE OF PRODUCT
Liquidity, Bequest	Lump-sum (single) payment
Adequate income	Programmed withdrawals: series with fixed or variable instalments
Life-long income	Periodic fixed or variable payment until the end of the annuitants live: Annuity or life pension
Combined arrangements	Programmed withdrawals combined with a deferred annuity starting at very old age, e.g. at age 80
CONCLUSION	NOT EVERY PRODUCT SERVES ALL NEEDS

RISK FEATURES OF RETIREMENT PRODUCTS

	Risk Protection			Other Benefits	
	Longevity	Investment	Inflation	Flexibility	Bequest
Lump-sum payment	No	No	No	Yes	Yes
Term annuity	No	Possible	Possible	No	Yes
Life long withdrawal plan	No	No	No	No / Yes	Yes
Variable life annuity + minimum payment guarantee + bonus	Possible / shared	Shared	Shared	No	No
Variable life annuity, unit linked	Shared	No	No	No	No
Fixed nominal annuity	Yes	Yes	No	No	No
Escalating nominal annuity	Yes	Yes	Partial	No	No
Fixed real life time annuity	Yes	Yes	Yes	No	No

REGULATORY RISK

RISK ASSESSMENT
GERMAN PENSION SYSTEM

	Statutory Pension Insurance	Occupational Pension Provision	Private Pension Provision (Assurance)
Default risk	No	Risk increased	Risk increased
Rate of return risk	Yes	Yes	Yes
Cost risk	Yes / No	Yes / No	Yes
Purchasing power risk	Yes	Yes	Yes

SOURCES OF RISK
GERMAN PENSION SYSTEM

	Statutory Pension Insurance	Occupational Pension Provision	Private Pension Provision (Assurance)
Default risk	-	Large insolvencies	Capital requirements Cost of capital
Rate of return risk	Unemployment Wage development	Economic downturn, low profitability	Low market rates (longevity)
Cost risk	Deviations from actuarial principles	Closing of schemes	Regulatory shortcomings, product differentiation
Purchasing power risk	Inflation (since 2011) inadequate or missing indexation		

Q & A

SUMMARY OF COURSE (1)
DATA GENERATION

Methods	Issues	Example from the course
Survey questionnaire	Biographic data: Record of entitlements in different pillars	AVID Altersvorsorge in Deutschland (Pension Provision in Germany)
		Financial literacy in different countries and socio-demographic groups

SUMMARY OF COURSE (2)
DATA GENERATION

Methods	Issues	Example from the course
Household Panel	Longitudinal data on sociological, economic, demographic	Socio-economic Panel (SOEP). Implemented by DIW
Anonymized administrative data	In-depth analysis of developments in the pension system	FDZ Forschungs-datenzentrum der DRV (Centre for research data)

SUMMARY OF COURSE (3)
METHODS OF EMPIRICAL ANALYSIS

Methods	Issues	Examples from the course
Scenario technique	Long-term forecasting	2014 EU Ageing Report
Modelling Technique	Impact of savings rate and in interest rate on accumulation of assets	Saving in a fully funded pension system
Simulation Technique	Impact of low interest rates on fully funded pension provision	Macro-financial market risk

SUMMARY OF COURSE (4)
METHODS OF EMPIRICAL ANALYSIS

Methods	Issues	Examples from the course
Case studies	Impact assessment of policy methods	Policy options to increase coverage in voluntary schemes
		Germany: Pension reforms to ensure fiscal sustainability
		Germany: Labour market reform
	Pension administration benchmarking.	Results for the CEM data base
International comparison	Identification of social trends	Replacement rates Risk of old-age poverty

Comments & Protests

Thank you very much!
Vielen Dank!