

Risk and portfolio choices for retirement with predictable returns
Forward look paper
Netspar

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Policy issues



Policy questions

- Do households invest enough in equity, given their long term objective to save for their retirement?
- Should portfolio advices be made dependent of age? Of market conditions?
- What is the adequate asset allocation for pension funds and life insurers, as a function of their (in)ability to share risk across generations?
- Does the planned new regulation of the long term saving industry (Solvency II) induce short-termism in that industry?

Portfolio allocations in Europe

Table 1

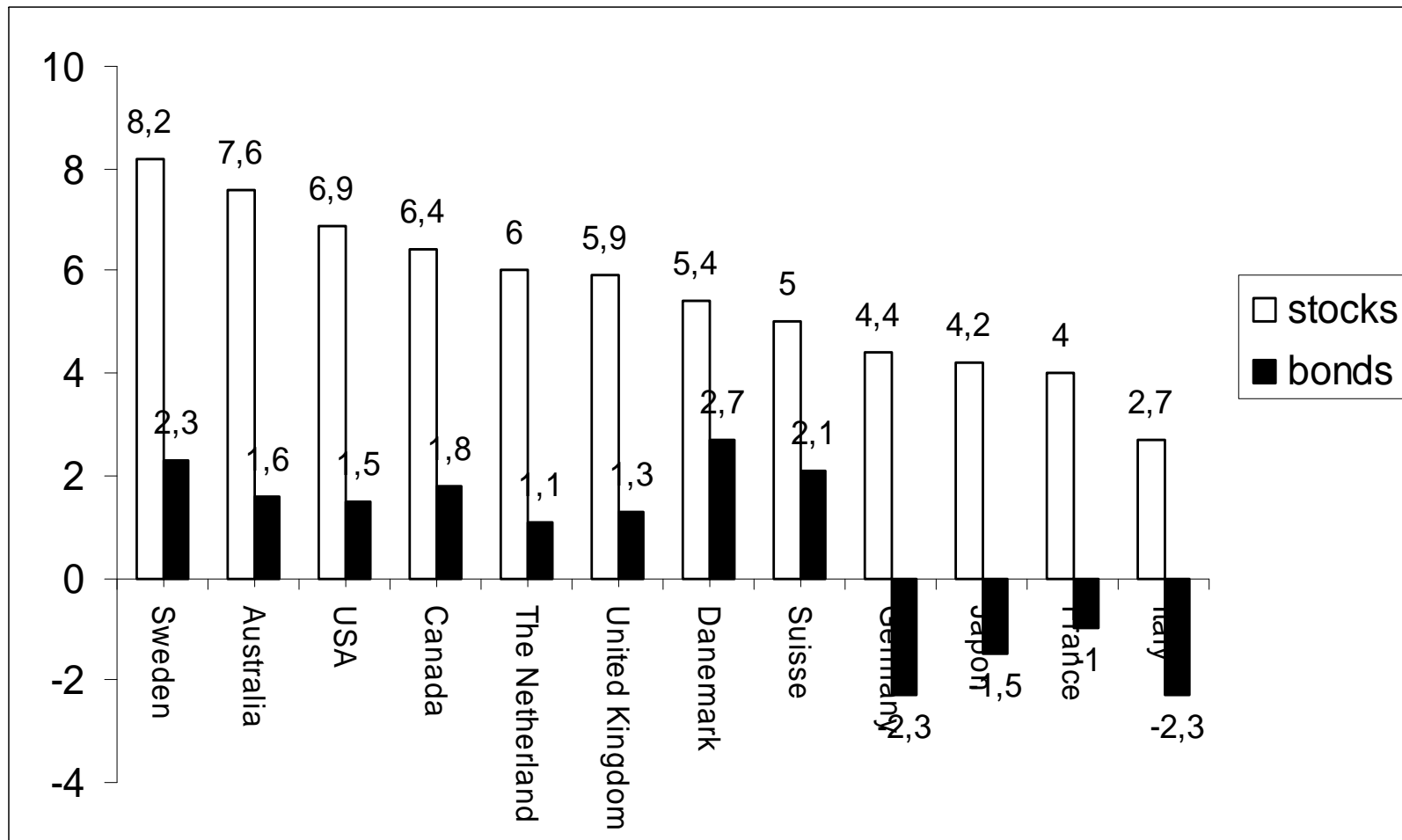
Cross-sectional age profile of participation and of the conditional share of financial risky assets

Age group	Italy (1989-95)		Germany(1993)		USA (1998) <i>a</i>	
	participation	share	participation	share	participation	share
Under 30	15.1	18.9	23.8	25.6	40.8	51.0
30-39	19.1	21.5	29.2	22.6	56.5	60.9
40-49	19.9	21.4	28.1	20.6	58.9	60.8
50-59	17.3	22.1	29.0	21.6	56.2	64.2
60-69	10.5	18.3	25.2	28.1	43.3	57.4
70 and over	6.9	16.2	20.4	41.4	30.8	60.7

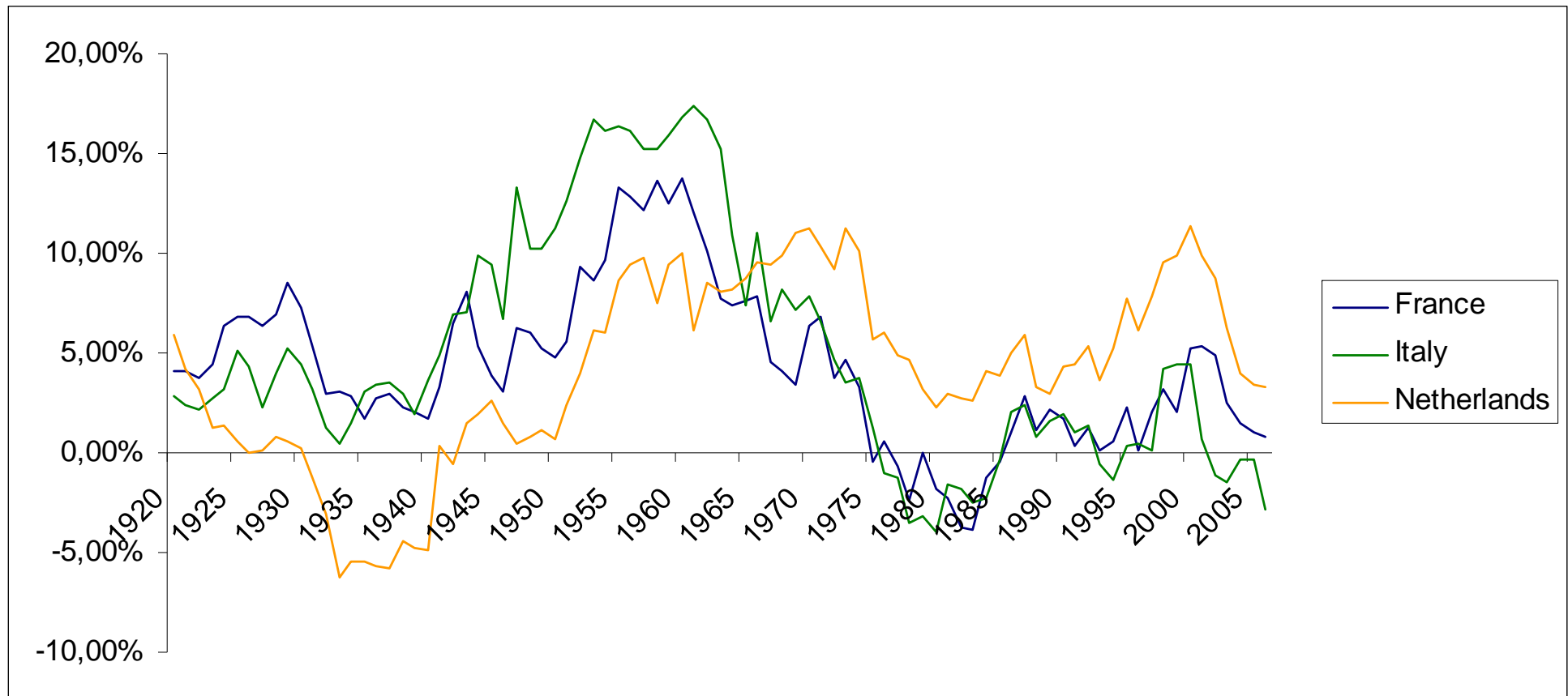
Source : Guiso, Haliassos and Jappelli (2002)

a : Age groups are Under 35, 35-44, 45-49, ..., 75 and above.

The starting point: Large equity premia



Annualized excess return of stocks over bonds for 20-year holding periods



Major progresses in understandings



The different meanings of time diversification

- “I can recoup transient losses by future gains”.
 - The fallacious interpretation of the Law of large numbers.
 - Merton-Mossin-Samuelson: myopia is optimal in the investment problem without serial correlation of asset returns.
 - Mean reversion? What do we know about serial correlations of stocks and bonds returns?
- “I can compensate transient losses by small changes in future consumption and labor supply”.
 - More flexibility enhances tolerance to risk on wealth.
- Improving intergenerational risk-sharing has an equivalent effect on collective risk tolerance (Gollier (2007)).

The crucial role of mean reversion in the public debate

- The existence of mean reversion of equity returns implies the optimality of
 - Market timing;
 - Long-term investors taking more portfolio risk.
- Value-at-Risk of equity for life insurers with a longer duration should be smaller.
- But do we/they believe in the predictability of assets returns?

- Merton-Mossin-Samuelson (1969):
 - Myopia is optimal in the absence of predictability.
 - Market timing and hedging strategy.
- Characteristics of the optimal strategy ($CRRA > 1$):
 - Learning: Detemple (1986), Gennotte (1986), Brennan (1998), and Barberis (2000).
 - Mean reversion: Kim and Omberg (1996) and Kogan and Uppal (2000).
 - Stochastic volatility: Chacko and Viceira (2000).
 - Unifying approach: Gollier (2004, 2007).

The literature on predictability: Econometrics and numerical optimization

- Mean reversion:
 - Poterba and Summers (1988), Campbell (1996), Campbell, Lo and MacKinlay (1997), Barberis (2000) and Cochrane (2001).
 - Large impact:
 - The implied standard deviation of ten-year returns is 23.7 percent, much smaller than the 45.2 percent value implied by the standard deviation of monthly returns.
 - Taking into account of mean-reversion typically doubles the average demand for stocks for a holding period of 10 years.
- Dynamics of assets returns modelled as a VAR(1):
 - Campbell and Viceira (2002), Campbell, Chan and Viceira (2003), Diris, Palm and Schotman (2008).

Consensus?

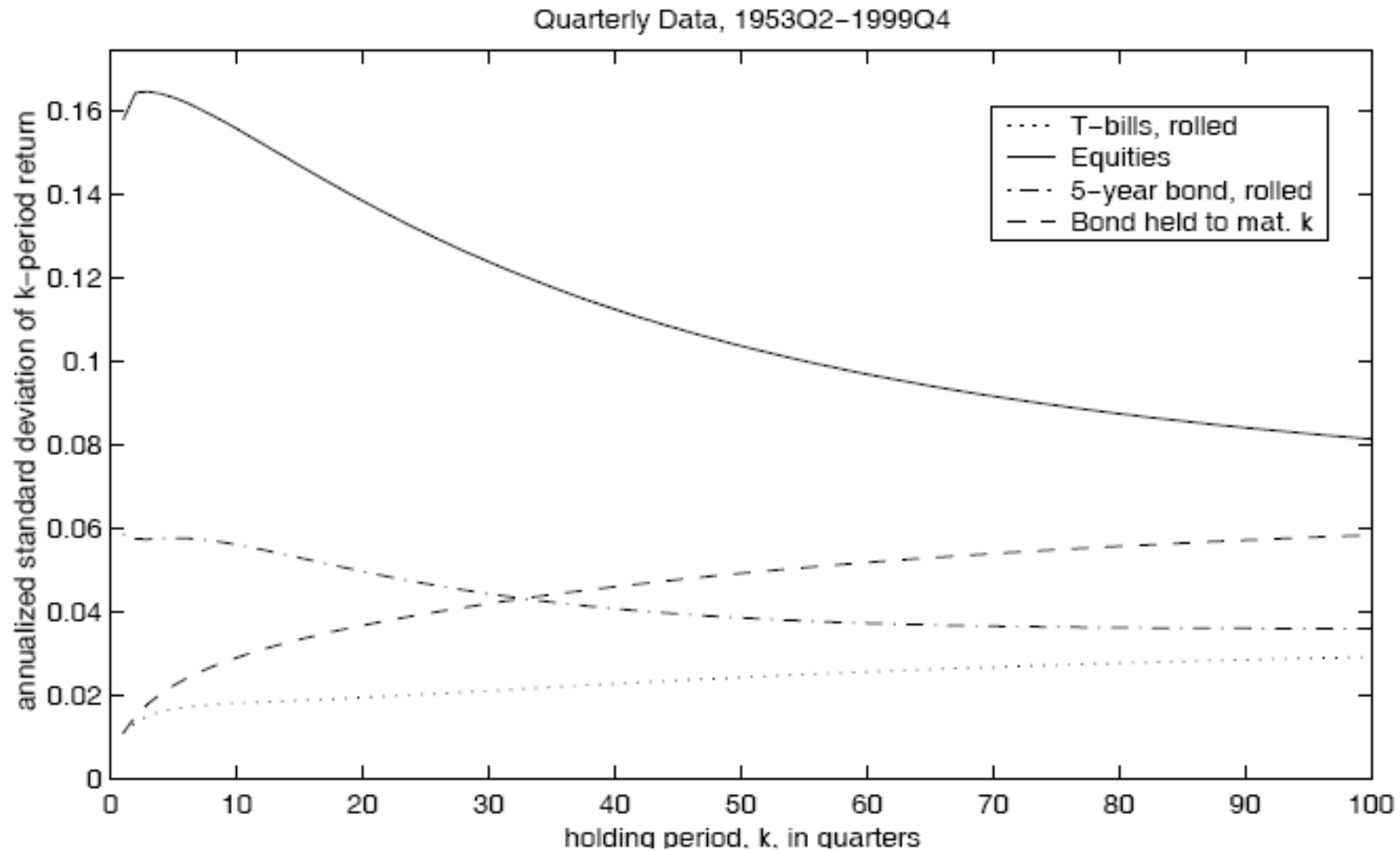
- Lettau and Ludvigson (2001, p. 842):

It is now widely accepted that excess returns are predictable by variables such as dividend-price ratios, earnings-price ratios, dividend-earnings ratios, and an assortment of other financial indicators.

- Goyal and Welch (2008, Abstract):

Our paper comprehensively reexamines the performance of these variables, both in-sample and out-of-sample, as of 2005. We find that [a] over the last 30 years, the prediction models have failed both in-sample and out-of-sample; [b] the models are unstable, in that their out-of-sample predictions have performed unexpectedly poorly:

USA: Campbell-Viceira (2002)



France: Bec-Gollier (2008)

- We use quarterly data over the period 1970Q1-2006Q4. Table 1: Annualized sample statistics for real asset log returns.

	mean	standard deviation
r_0	2.31%	1.34%
x_e	4.29%	23.05%
x_b	1.38%	6.55%
r_0^{nom}	7.34%	1.72%
$ldmp$	-4.95	0.56
spr	1.02%	1.39%

Table 1: Annualized sample statistics for real asset log returns

Table 3: VAR estimation results

$$z_t = \Phi_0 + \Phi_1 z_{t-1} + v_t,$$

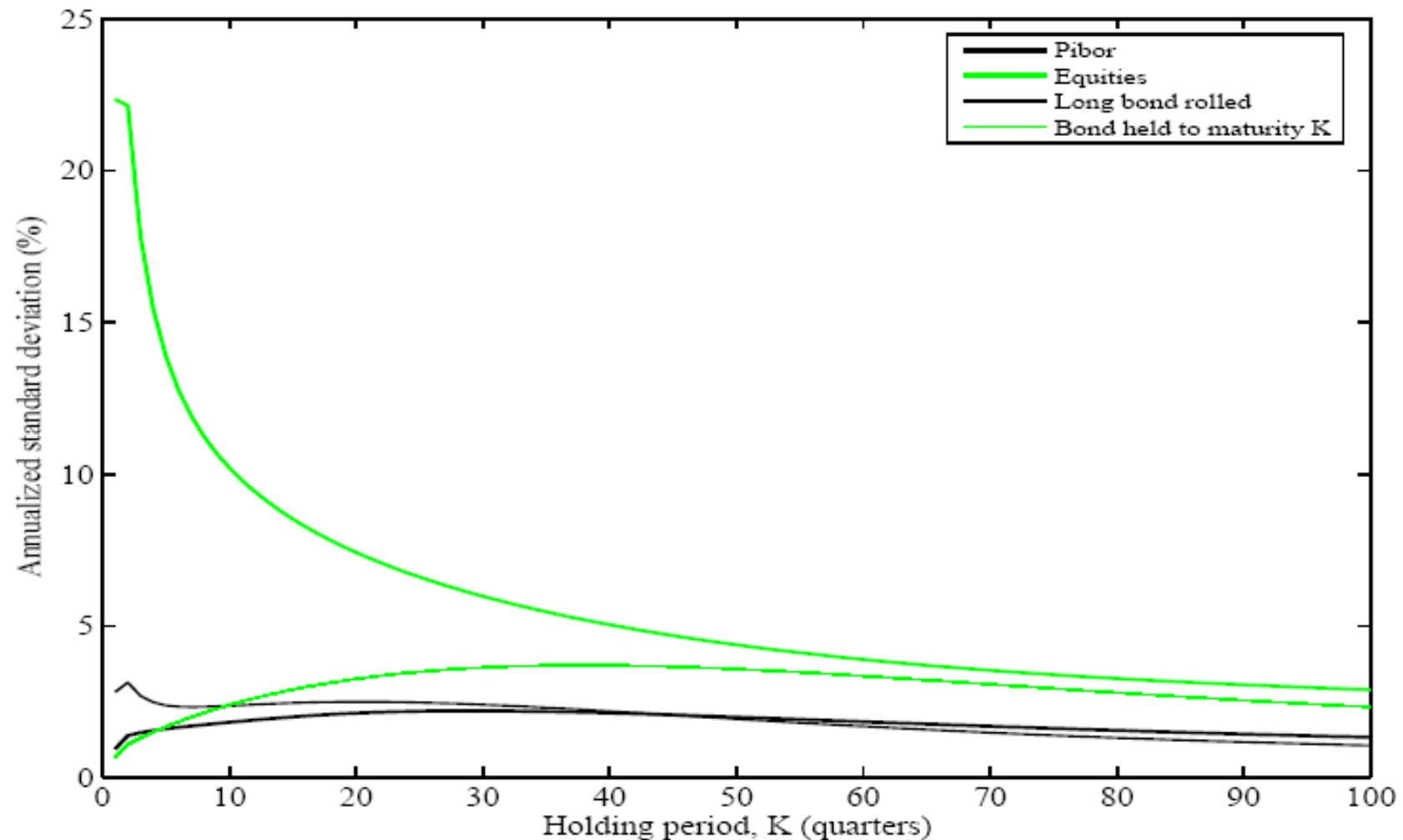
	$r_{0,t}$	$x_{e,t}$	$x_{b,t}$	$r_{0,t}^{nom}$	$ldmp_t$	spr_t
$r_{0,t-1}$	0.923 (0.059) [15.54]	0.828 (0.728) [1.14]	0.394 (0.197) [2.00]	-0.0434 (0.059) [-0.74]	-0.027 (0.008) [-3.29]	-0.032 (0.053) [-0.59]
$x_{e,t-1}$	0.005 (0.007) [0.71]	-0.022 (0.093) [-0.24]	-0.027 (0.025) [-1.06]	0.004 (0.007) [0.55]	-0.001 (0.001) [-0.39]	-0.002 (0.007) [-0.28]
$x_{b,t-1}$	-0.037 (0.027) [-1.38]	0.667 (0.332) [2.01]	0.274 (0.090) [3.04]	-0.085 (0.027) [-3.17]	-0.006 (0.004) [-1.57]	0.055 (0.024) [2.26]
$r_{0,t-1}^{nom}$	0.083 (0.048) [1.75]	-1.037 (0.585) [-1.77]	-0.145 (0.158) [-0.91]	1.010 (0.047) [21.41]	0.013 (0.007) [1.95]	-0.006 (0.043) [-0.14]
$ldmp_{t-1}$	-0.629 (0.331) [-1.90]	8.805 (4.068) [2.16]	1.127 (1.101) [1.02]	-0.323 (0.328) [-0.98]	0.850 (0.046) [18.36]	0.188 (0.298) [0.63]
spr_{t-1}	0.287 (0.075) [3.81]	0.844 (0.926) [0.91]	0.829 (0.251) [3.31]	0.219 (0.075) [2.94]	-0.017 (0.010) [-1.59]	0.703 (0.068) [10.36]
c	-3.822 (1.856) [-2.06]	47.317 (22.769) [2.08]	5.378 (6.163) [0.87]	-1.753 (1.836) [-0.95]	-0.757 (0.259) [-2.92]	1.304 (1.669) [0.78]
R-squared	0.88	0.12	0.21	0.93	0.95	0.65

Standard errors in () and t-statistics in [].

Table 4: Standard deviations and correlations of residuals

	r_0	x_e	x_b	r_0^{nom}	$ldmp_t$	spr_t
r_0	0.930	0.285	-0.432	0.731	0.109	-0.707
x_e	—	11.409	0.288	-0.337	-0.799	0.234
x_b	—	—	3.088	-0.698	-0.245	0.238
r_0^{nom}	—	—	—	0.920	0.248	-0.857
$ldmp$	—	—	—	—	0.130	-0.147
spr	—	—	—	—	—	0.836

Annualized volatility as a function of holding duration



Low correlation between stocks and bonds for long durations

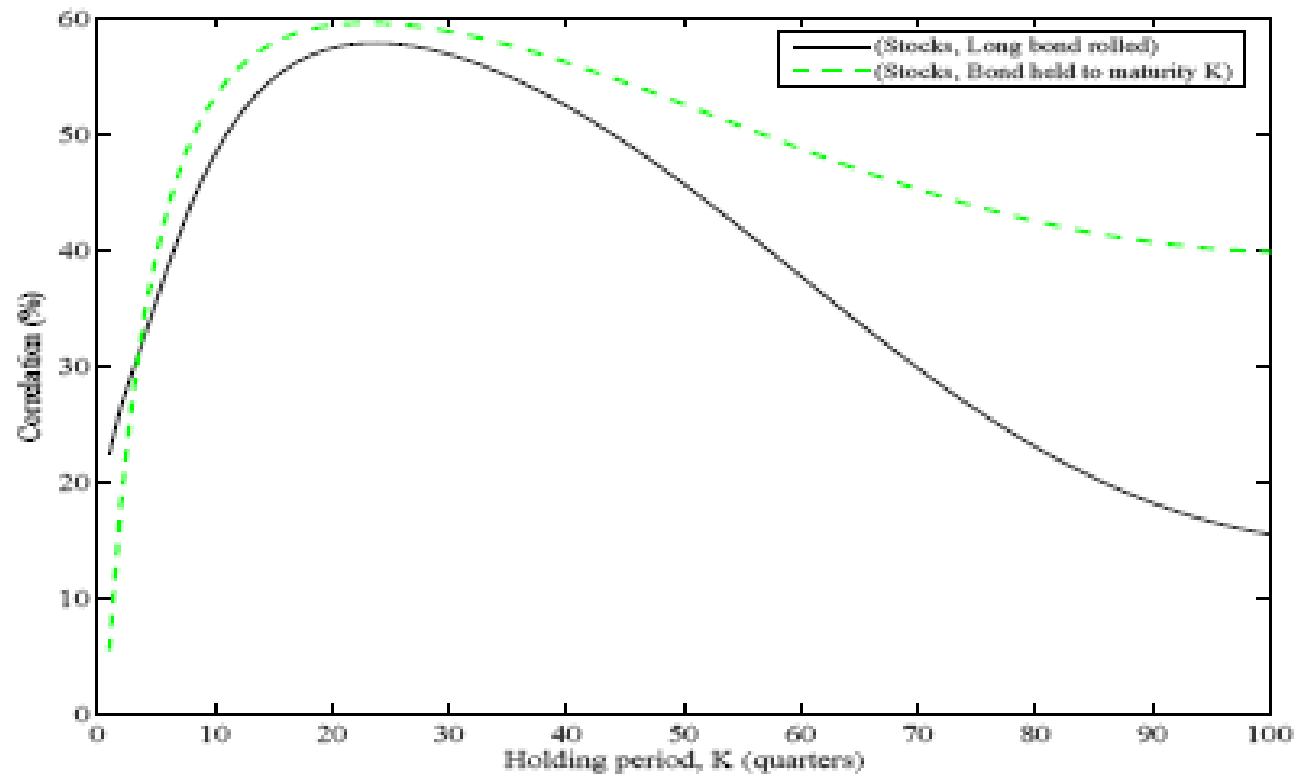
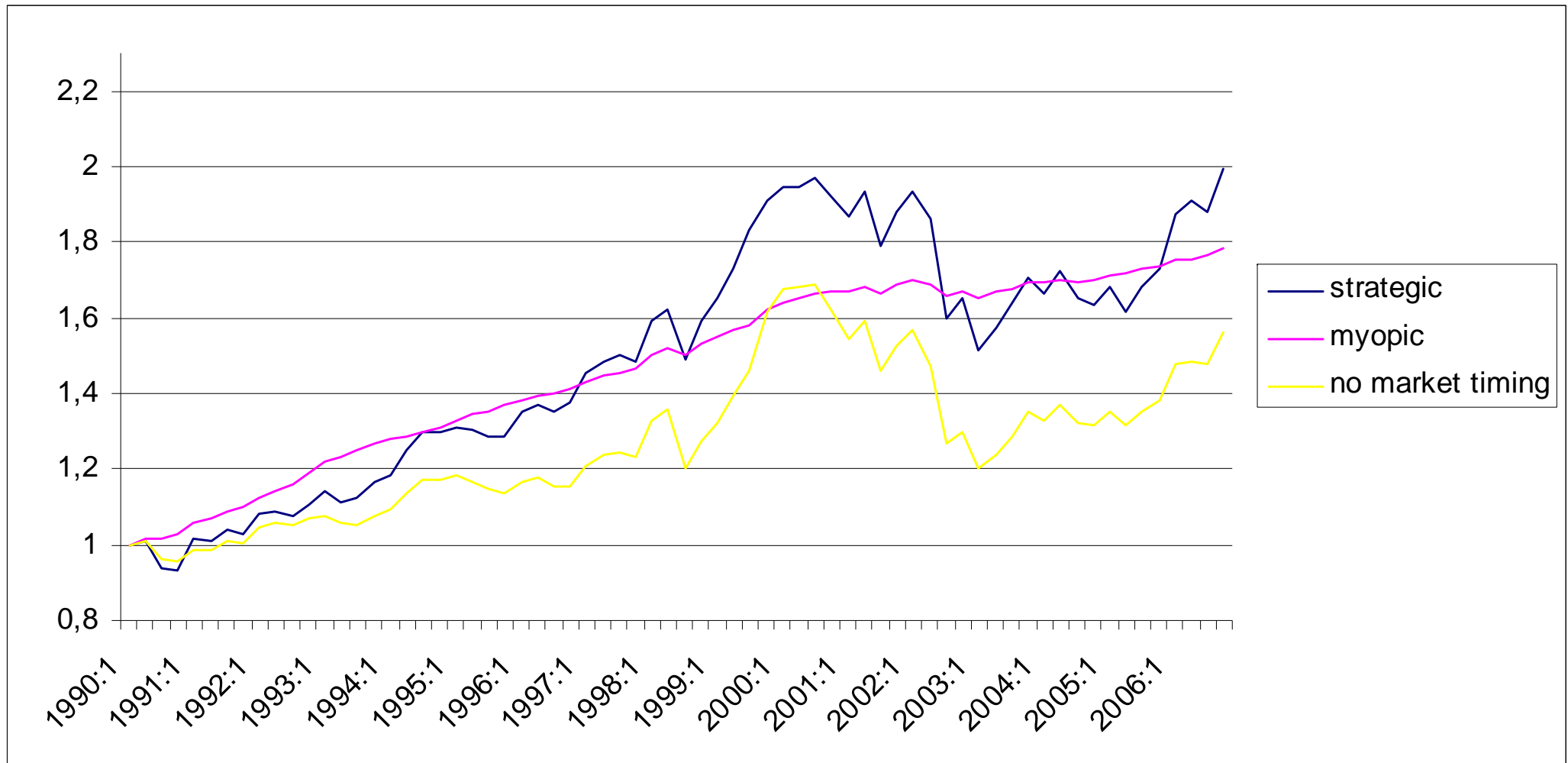


Figure 2: Correlations of real returns implied by VAR(1) estimates

How can investors benefit from all these findings?

- Buy-and-hold: Larger risk tolerance of long-term investors.
- Market timing:
 - Numerical methods: Log-linearization (Campbell, Chan and Viceira), or Monte-Carlo simulations (Diris, Palm, Schotman).
 - Very volatile asset allocations contingent to the state variables.
 - For France, an increase of the real interest rate by 100 basis points raises the share of wealth invested in stocks by 26 percentage points, and the one invested in bonds by 46 percentage points.
 - Large in-sample performance of the strategic asset allocation.

France: Out-of-sample real value of the myopic and optimal portfolios (RRA=20)



Current state of play of European research infrastructures and networks

Required research infrastructures, methodological innovations, data,...



- What do we know about predictability of asset returns on European markets?
- Bec-Gollier is the only study I am aware of using European data (France).
- It is crucial to test the predictability hypothesis on European data because of
 - the importance of its policy implications;
 - the weakness of the existing findings when using US data, and the subsequent absence of consensus on the subject.

Request for proposals by the European Savings Institute (OEE), April 2008

- Estimation of Assets Returns Predictability in Europe and its Implications on Individual Assets Management

Michael Schröder, Andreas Schrimpf	ZEW	Estimation of Assets Returns Predictability in Europe and its Implications on Individual Assets Management	the United Kingdom, Germany, Italy	38 500 €
Mikael Petitjean	Louvain	Multi-Period Asset Allocation in Europe	European Countries	15 000 €
Carlo A. Favero	Bocconi	How Much Does European Stock Market Risk Decline with the Investment Horizon?	Europe	33 000 €
Christian Gollier	CREST and Toulouse	Assets return predictability and assets management	Germany, yhe United Kingdom, the Netherlands, Blegium, Austria, Denmark, Norway, Sweden, Switzerland	30 000 €
Eric Jondeau, Michael Rockinger	HEC Lausanne	Estimation of Assets Returns Predictability in Europe and its Implications on Individual AssetsManagement	France, Germany, Italy, the Netherlands, Sweden, Switzerland, the United Kingdom	30 000 €
Patrice Fontaine	Grenoble	Estimation of Assets Returns Predictability in Europe and its Implications on Individual Assets Management	European Countries	32 200 €

- Netspar (Schotman, Koijen-Nijman-Werker)

Potential methodological innovations

- Inclusion of potential extreme events in beliefs.
- Importance of the remaining parametric uncertainty, and role of the investors' ambiguity aversion.
- Comparison of various numerical optimization methods.

- Revival of the debate on the role of the portfolio horizon on optimal asset allocation, and market timing.
- Crucial policy implications for the individual and collective savings industry.
- Does there exist stable predictable variables?
- Data, data, data!