
COMPARISON OF VARIABLE ANNUITIES BETWEEN THE NETHERLANDS AND DENMARK

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MOTIVATION

- ▶ The Dutch and the Danish pension systems are frequently referred to as “the best in the world” (Mercer, 2017). Nevertheless, the Danish and Dutch pension system also face challenges:
 - › Current low-interest rate environment
 - › Increasing life-expectancy and old-age dependency ratios.
- ▶ Makes it challenging for pension companies to honor promised (or guaranteed) pensions.
- ▶ Dutch and Danish pension sectors have undergone and are undergoing considerable changes.
- ▶ This paper focuses on the shift from “safe” to “risky” (for the pension holder) pension products in both countries.
 - › Moving from fixed annuities (guaranteed) to variable (unguaranteed) pension products.

FINDINGS: COMPARING NETHERLANDS AND DENMARK

- ▶ Wide-spread use of Defined Benefits (DB) plans in The Netherlands: 95%.
- ▶ Almost no DB plans in Denmark: 5%.

- ▶ In Netherlands: Discussion primarily is about risk in decumulation phase.
- ▶ In Denmark: Discussion about risk in accumulation and decumulation phase.

- ▶ Denmark can learn from Netherlands when it comes to illustrating risk during decumulation phase.
- ▶ Netherlands can learn from Denmark when it comes to regulation during transition phase.

- ▶ We study a case where customers were given a choice of giving up guarantees.
 - › Young male economists in big cities with low guarantees and low pension wealth more likely to give up guaranty.

ROAD MAP

- Dutch pension system: Key aspects and current discussions.
- Danish pension system: Key aspects and current discussions.
- Case study. Who chose to give up guarantees?
- Conclusions

THE NETHERLANDS

- ▶ After the recent financial crisis, the funding ratios of several Dutch pension funds dropped below 100%.
 - › Low interest rates
 - › Increasing life expectancies.
- ▶ This have led to reductions in pension payments for Dutch policyholders.
- ▶ And triggered a debate about the need for a renewal of the pension system in The Netherlands.
 - › An important part of this debate centers on a move from CDC to more flexibility.

THE NETHERLANDS

- ▶ A new law for DC plans has been implemented in 2016 allowing [customers to invest in risky assets also during the pay-out phase](#).
 - › In the hope of harvesting risk premiums.
 - › A process that allows customers to shift from relatively safe products to risky products.

- ▶ In addition, a shift from “DB” plans to plans with more DC features is underway.
 - › Personal accounts
 - › Also containing collective buffers.

THE NETHERLANDS

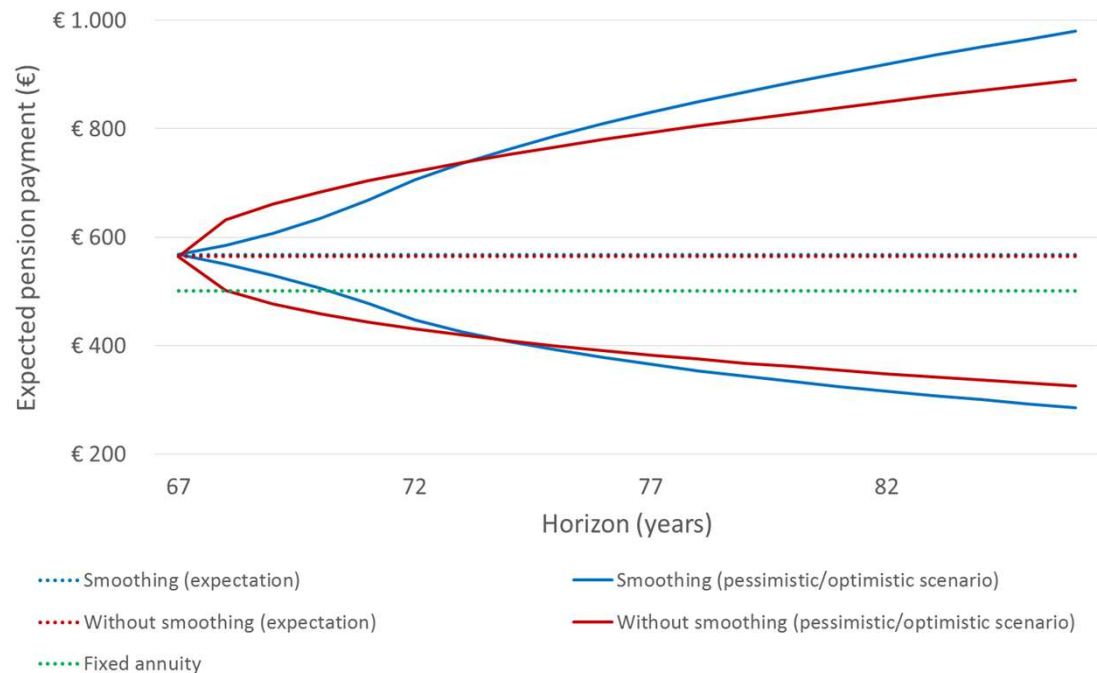
- ▶ Improved Defined Contribution Scheme Act (“Wet Verbeterde Premieregeling”, WVP)
- ▶ Before WVP
 - › At retirement, pension wealth converted into a fixed life-long annuity
 - › After retirement, pension payments are fixed and known.
- ▶ After WVP
 - › At retirement, pensioner can choose between fixed and variable annuity (or a mix)
 - › If you chose variable annuity, then pension wealth is invested in risky assets and thus the yearly pension payments are higher in expectation at the cost of variability (risk-return trade-off).
 - › Law protects against decreasing expected pension through lifetime.

THE NETHERLANDS

- ▶ Assumed Interest Rate (“Vaste Daling”)
 - › Total pension wealth can be divided unequally among future years.
 - › E.g. initially low payments and higher payments at longer horizon.
 - › Law protects against decreasing expected pension through lifetime.
 - › Together with expected returns, the AIR can be chosen such that all expectations are constant (as in next slides example).

DECUMULATION PHASE

- ▶ The individual invests throughout retirement.
- ▶ **Fixed annuity:**
 - > No risk.
- ▶ **Variable annuity:**
 - > More risk -> Higher expected return.
 - > 95% confidence interval
- ▶ **Smoothing:**
 - > Financial shocks can be smoothed -> Less risk in near future -> At cost of higher long run decrease



DENMARK

- ▶ The majority of products in Denmark have **historically included a guaranteed annual return** based on a minimum guaranteed interest rate.
 - › I.e. the contributions were guaranteed to increase by a certain minimum return.
 - › Interest guarantees between 0% and 4.5%.
- ▶ When interest rates are low, pension guarantees cause pension companies to invest mainly in safe assets, in order to fulfil guarantees in DC schemes.
 - › Similar issue in the Netherlands: Honor promised benefits in DB schemes.

DENMARK

- ▶ Safe investments secure that pension payments will be known and safe.
 - › However, returns to investment will be low, causing pension wealth to be low, too.
- ▶ In non-guaranteed pension schemes, pension companies can invest more in risky assets.
 - › Harvesting the risk premium.
 - › Generate higher **expected** returns as a result.
- ▶ The cost, of course, is that pensions become more risky.

DENMARK: FROM GUARANTEED FIXED ANNUITIES TO UNGUARANTEED VARIABLE ANNUITIES

- ▶ In May 2010, Sampension decided in cooperation with central labor market parties to discontinue the guaranteed benefits effective January 1, 2011.

- ▶ This inspired the majority of the pension funds in Denmark to make a similar change for their policyholders.
 - › In the some cases, the pension funds made a collective decision to transfer all policyholders to zero interest guarantees.

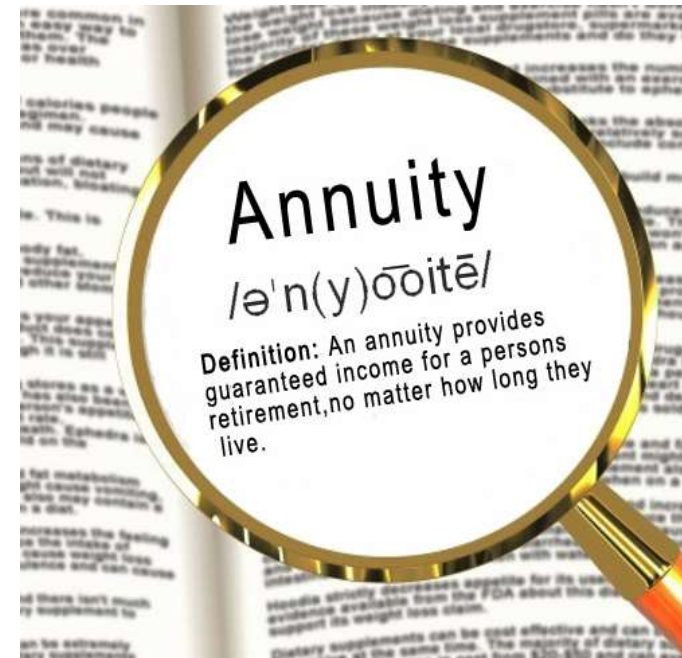
 - › Other funds (Danica, PFA and JØP) offered the policyholders the option to decide for themselves whether they wanted to give up their interest guarantees or not.

POLICYHOLDERS CARRY MORE RISK

- ▶ Policyholders now carry both
 - › The financial risk
 - › The longevity risk

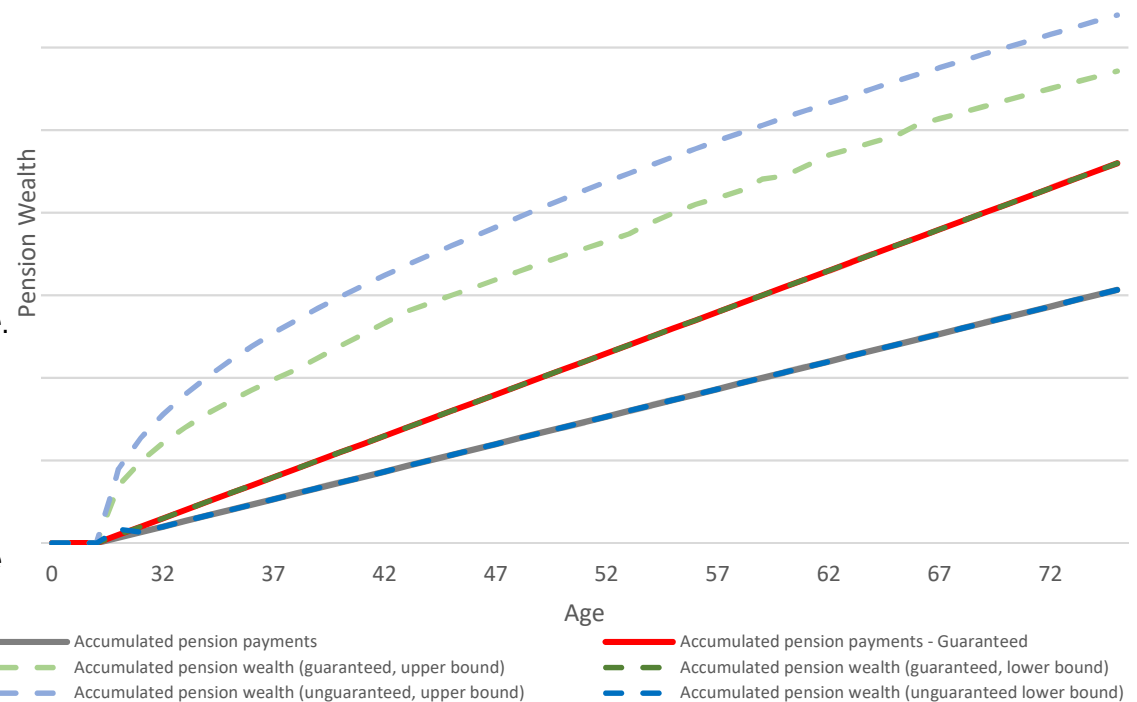
Pension benefits variable in the payout phase based on market performance and developments in life expectancy.

- ▶ The standard definition of an annuity no longer applies.



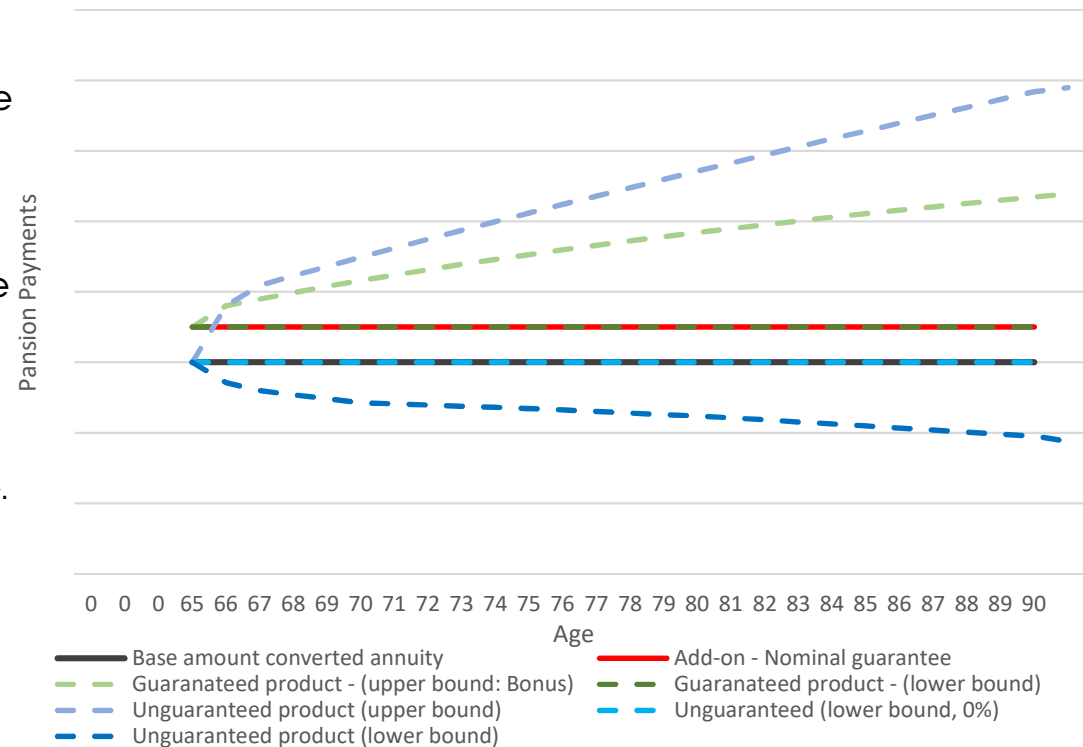
ACCUMULATION PHASE

- ▶ The individual save throughout his or her work life.
- ▶ **Guaranteed product:**
 - › Guaranteed average annual minimum returns -> Value of the policy balance can only increase.
 - › Distribution of surplus: Only upside.
- ▶ **Unguaranteed product:**
 - › More risky products -> Higher expected return.
 - › Bounded at the value of the accumulated pension wealth due to the 0% guarantee.



PAY-OUT PHASE

- ▶ Assume two identical individuals with the exception that one has a guaranteed product and the other an unguaranteed product.
- ▶ At retirement the value of policy balance is converted into an annuity.
- ▶ **Guaranteed product:**
 - › Increases the base amount with an add-on from the nominal guarantee.
 - › Distribution of surplus: Only upside
- ▶ **Unguaranteed product:**
 - › Higher expected returns.
 - › Potentially reduced payments.



REGULATORY INVOLVEMENT

- ▶ Danish FSA have been heavily involved in the supervision of the discontinuity of the interest guarantees.
 - › Did the policyholder receive sufficient information regarding the financial implications?
 - › How do you price the value of the interest rate guarantee?
 - › How much of the undistributed bonus reserved for the participating contract with profit sharing was the policyholder entitled to?

- ▶ FSA currently concerned about the risks associated with unguaranteed market return products.
 - › Amount of alternative investments.
 - › Classification and size of risk.
 - › Products characterized by one company as low-risk may involve greater risk for a policyholder than products categorized as high-risk by another company.

JØP CASE STUDY

- ▶ Prior to the SamPension events in 2010/11, JØP had already offered their policyholder to relinquish their interest rate guarantees in 2007.
- ▶ Members had different levels of guarantees depending on the date of admission.

Date of Admission	Level of Guarantee
Before 1st January 1990	3.70% or 4.25 %
1st January – 31st December 1996	3.70%
1st January 1997 – 30th June 1999	3.00%
1st July 1999 – 1st July 2005	2.00%
From 1st July 2005	0.00%

- ▶ Policyholders with a [guaranteed interest rate above zero](#) are grouped into a separate division within the pension fund called Division 1.

DATA – DIVISION 1

Variable	Obs.	Mean	Std. Dev.	Min	Max
Election_Outcome	31,497	17.9%	38.3%	0	1
General					
Male	31,497	56.2%	49.6%	0	1
Married	31,497	65.4%	47.6%	0	1
Retired	31,497	5.7%	23.2%	0	1
Age					
Age_2029	31,497	3.7%	18.9%	0	1
Age_3039	31,497	38.4%	48.6%	0	1
Age_4049	31,497	27.5%	44.7%	0	1
Age_5059	31,497	18.1%	38.5%	0	1
Age_6069	31,497	8.3%	27.7%	0	1
Age_6669	31,497	2.0%	14.0%	0	1
Age_70100	31,497	2.0%	14.0%	0	1
Education					
Economics	31,497	15.7%	36.4%	0	1
Political Science	31,497	19.3%	39.5%	0	1
Law	31,497	33.8%	47.3%	0	1
Business Economics	31,497	12.9%	33.5%	0	1
Education_Other	31,497	18.3%	38.6%	0	1

Variable	Obs.	Mean	Std. Dev.	Min	Max
Region					
Copenhagen	31,497	50.6%	50.0%	0	1
Greater Copenhagen	31,497	9.0%	28.6%	0	1
Zealand & Falster	31,497	8.5%	27.9%	0	1
Funen & Islands	31,497	4.0%	19.6%	0	1
South Jutland	31,497	3.5%	18.3%	0	1
West Jutland	31,497	3.0%	17.0%	0	1
Central Jutland	31,497	11.2%	31.6%	0	1
North Jutland	31,497	4.4%	20.6%	0	1
Region_Other	31,497	5.8%	23.5%	0	1
Level of Guarantee					
InterestGua_2	31,497	31.9%	46.6%	0	1
InterestGua_3	31,497	11.8%	32.3%	0	1
InterestGua_3_7	31,497	25.8%	43.8%	0	1
InterestGua_4_25	31,497	30.5%	46.0%	0	1
Level of Pension Wealth					
PensionWealth_VeryLow	31,497	16.4%	37.0%	0	1
PensionWealth_Low	31,497	32.1%	46.7%	0	1
PensionWealth_Medium	31,497	22.1%	41.5%	0	1
PensionWealth_High	31,497	21.2%	40.9%	0	1
PensionWealth_VeryHigh	31,497	8.1%	27.3%	0	1

RESULTS FROM PROBIT ESTIMATION

Number of obs	31,497			
Pseudo R2	16.96%			
	dy/dx	Std.Err.	z	P> z
General				
Male	2.72%	0.41%	6.58	0.0%
Married	-0.87%	0.43%	-2.04	4.2%
Retired	-11.35%	4.14%	-2.74	0.0%
Age				
Age_3039	-6.05%	0.91%	-6.62	0.0%
Age_4049	-15.31%	1.02%	-14.99	0.0%
Age_5059	-30.64%	1.33%	-23.01	0.0%
Age_6069	-39.21%	2.26%	-17.38	0.0%
Age_6669	-33.26%	4.07%	-8.17	0.0%
Age_70100	-38.50%	7.82%	-4.92	0.0%
Education				
Political Science	-1.40%	0.64%	-2.19	2.9%
Law	-4.85%	0.63%	-7.74	0.0%
Business Economics	-5.79%	0.72%	-8.07	0.0%
Education_Other	-4.75%	0.71%	-6.7	0.0%

Region				
Greater Copenhagen	-1.73%	0.76%	-2.29	2.2%
Zealand & Falster	-3.34%	0.78%	-4.26	0.0%
Funen & Islands	-1.29%	1.06%	-1.22	22.3%
South Jutland	-3.29%	1.19%	-2.76	0.6%
West Jutland	-4.41%	1.25%	-3.53	0.0%
Central Jutland	0.17%	0.65%	0.26	79.1%
North Jutland	-3.80%	1.01%	-3.75	0.0%
Region_Other	-6.33%	0.92%	-6.85	0.0%
Level of Guarantee				
InterestGua_3	-5.49%	0.64%	-8.61	0.0%
InterestGua_3_7	-8.13%	0.68%	-11.91	0.0%
InterestGua_4_25	-12.40%	1.15%	-10.82	0.0%
Level of Pension Wealth				
PensionWealth_Low	6.27%	0.58%	10.85	0.0%
PensionWealth_Medium	8.35%	0.76%	11.05	0.0%
PensionWealth_High	6.28%	1.05%	5.99	0.0%
PensionWealth_VeryHigh	6.28%	2.19%	0.32	75.2%

RESULTS FROM PROBIT ESTIMATION

- ▶ Being **male** slightly increases the probability (2.7%) of giving up the interest rate guarantee.
- ▶ **Marital status** has virtually no effect on the decision.
- ▶ Being **retired** decreases the probability of 11.3% of relinquishing the guarantee.
- ▶ **The older you are** the more likely you are to remain in your current contract.
- ▶ **Economists** more likely to give up guarantees.

RESULTS FROM PROBIT ESTIMATION

- ▶ **Regional** differences. Policyholders in Copenhagen more likely to abolish guarantee.
- ▶ Strong significant effects that the higher the **level of guarantee**, the less likely you are to give it up.
 - › Compared to a 2% level of guarantee an individual with a 4.25% level of guarantee are 12.4% less likely to relinquish it.
- ▶ Higher **pension wealth** will decrease the probability of giving up your guarantee.
- ▶ *Young male economists in big cities with low guarantees and low pension wealth more likely to give up guaranty.*

CONCLUDING REMARKS

- ▶ Danish and Dutch pension systems among “the best in the world”.
- ▶ Danish and Dutch pension face common challenges.
 - › Low interest rates, increased life expectancy,
- ▶ Both Netherlands and Denmark move away from guarantees.
 - › Netherlands: Discussion about risk in decumulation phase.
 - › Denmark: Discussion about risk in accumulation and decumulation phase.

CONCLUDING REMARKS

- ▶ In Denmark, the shifts to non-guarantees started before regulation was really in place.
 - › Learning. Good idea to think about how to regulate transitions before they take place.
- ▶ Denmark can learn something from The Netherlands in terms of how to inform customers about the risk they face.
 - › Danish pension funds show only expected pensions.
 - › In The Netherlands, customers are told about their expected pension when entering retirement and ten years after, in a good and a bad scenario (5% and 95% quantile).
- ▶ If given a choice, young men in big cities with low guarantees and low pension wealth more likely to give up guarantees.