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Projecting mortality

Harder than expected?

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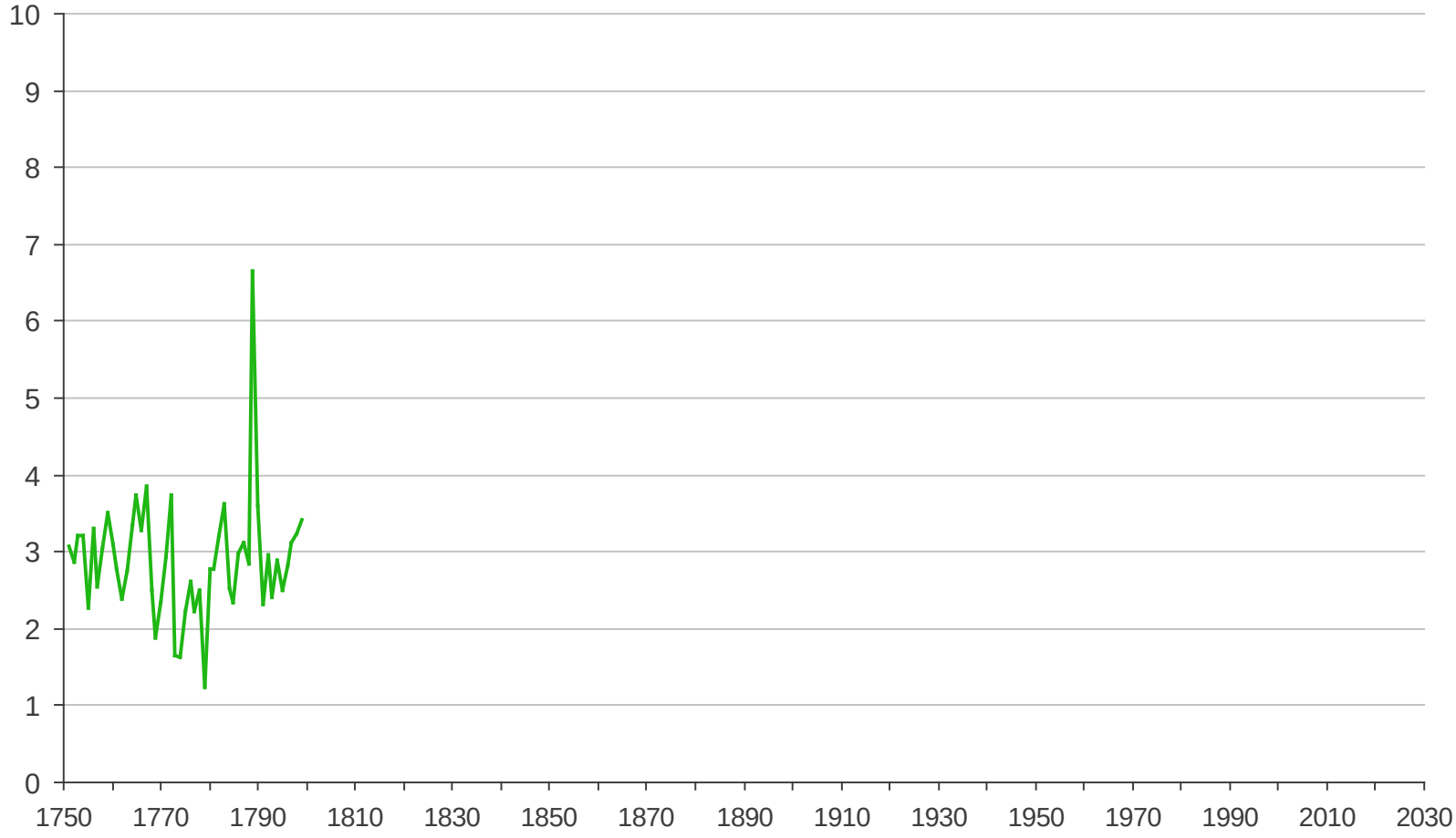
The actuarial projection

- The year is 1800. A Swedish actuary wants to project the difference in life expectancy between males and females as of year 2030.
- Let us see how he and later actuaries succeed

Study statistics from 1750

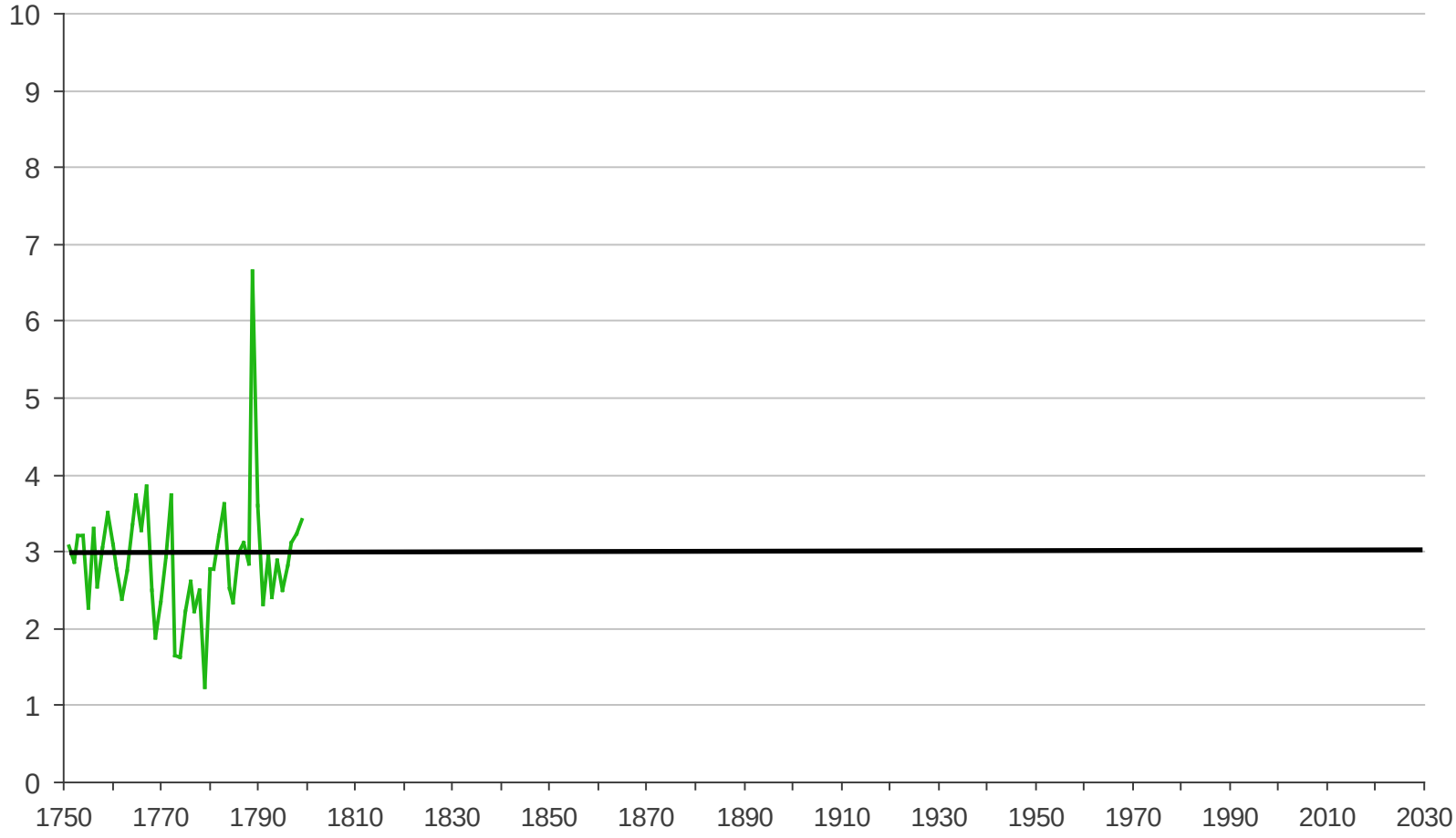
Difference in life expectancy females - males, per calendar year



Source: Human Mortality Data Base

The 1800 actuary makes this projection

Projected value at 2030: 3.0

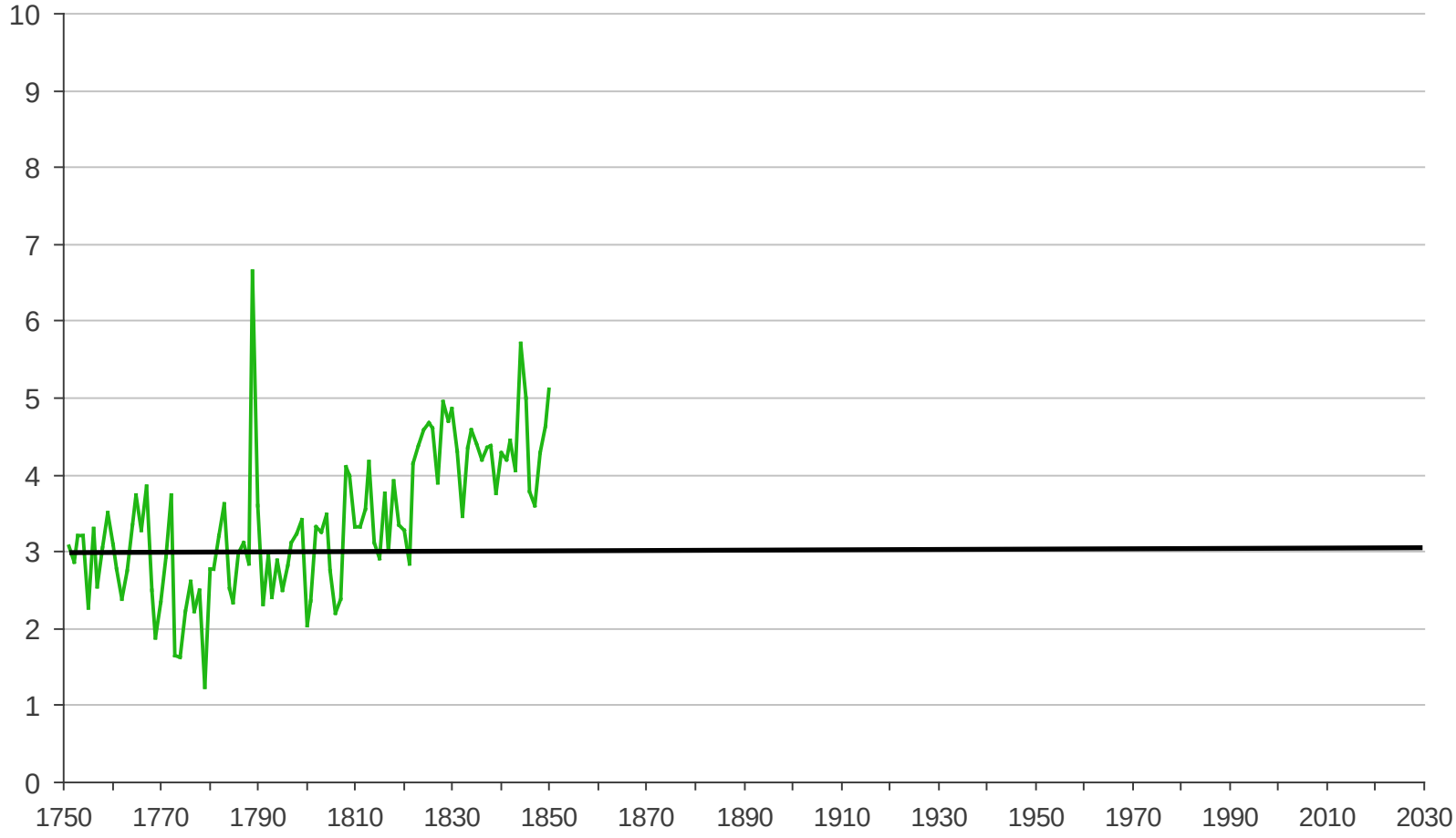


Source: Human Mortality Data Base

Value at 2010: 3.00

1850, the next generation of actuaries looks at the projection

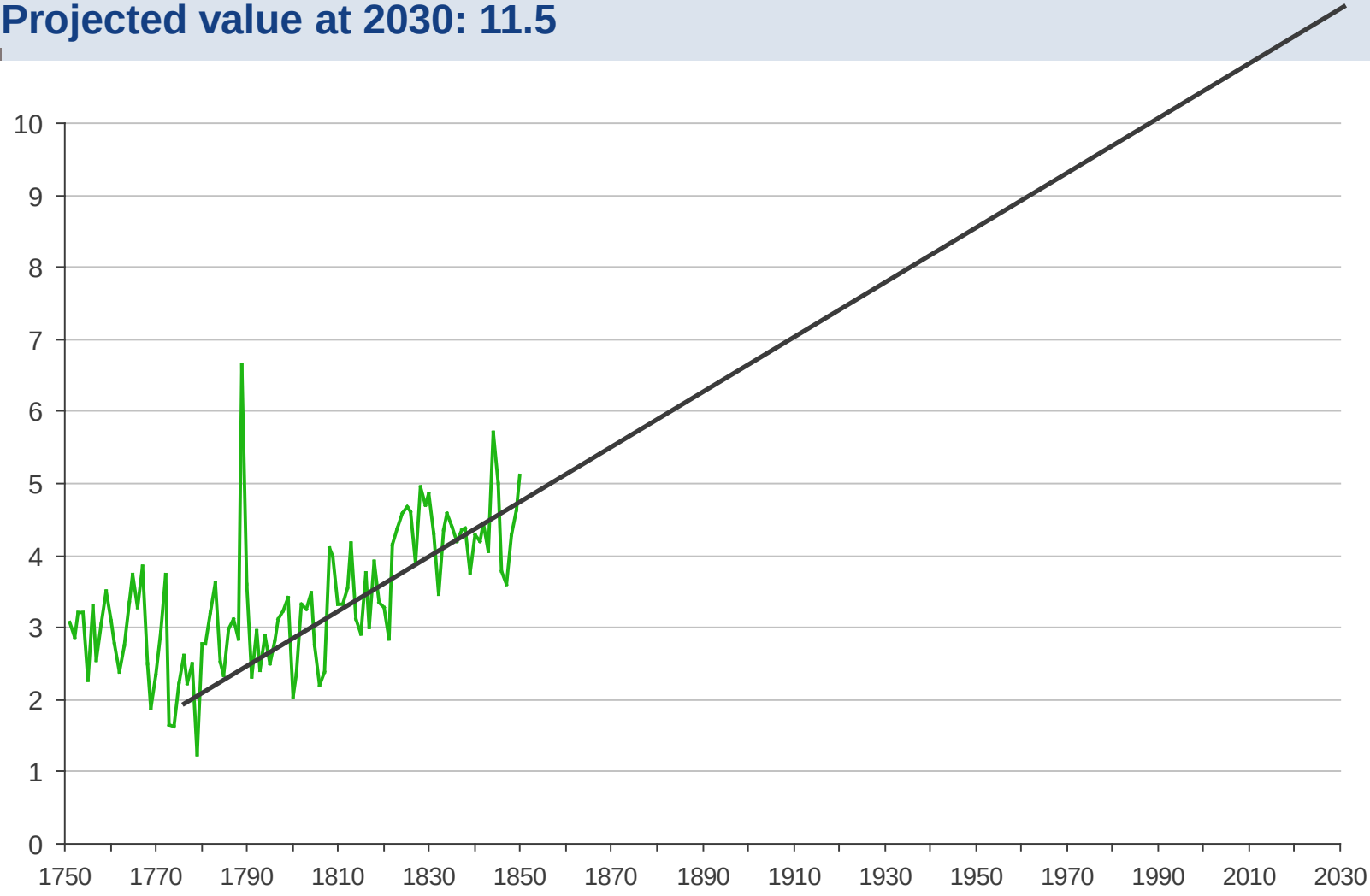
Not that good!!!



Source: Human Mortality Data Base

The 1850 generation of actuaries makes a new projection

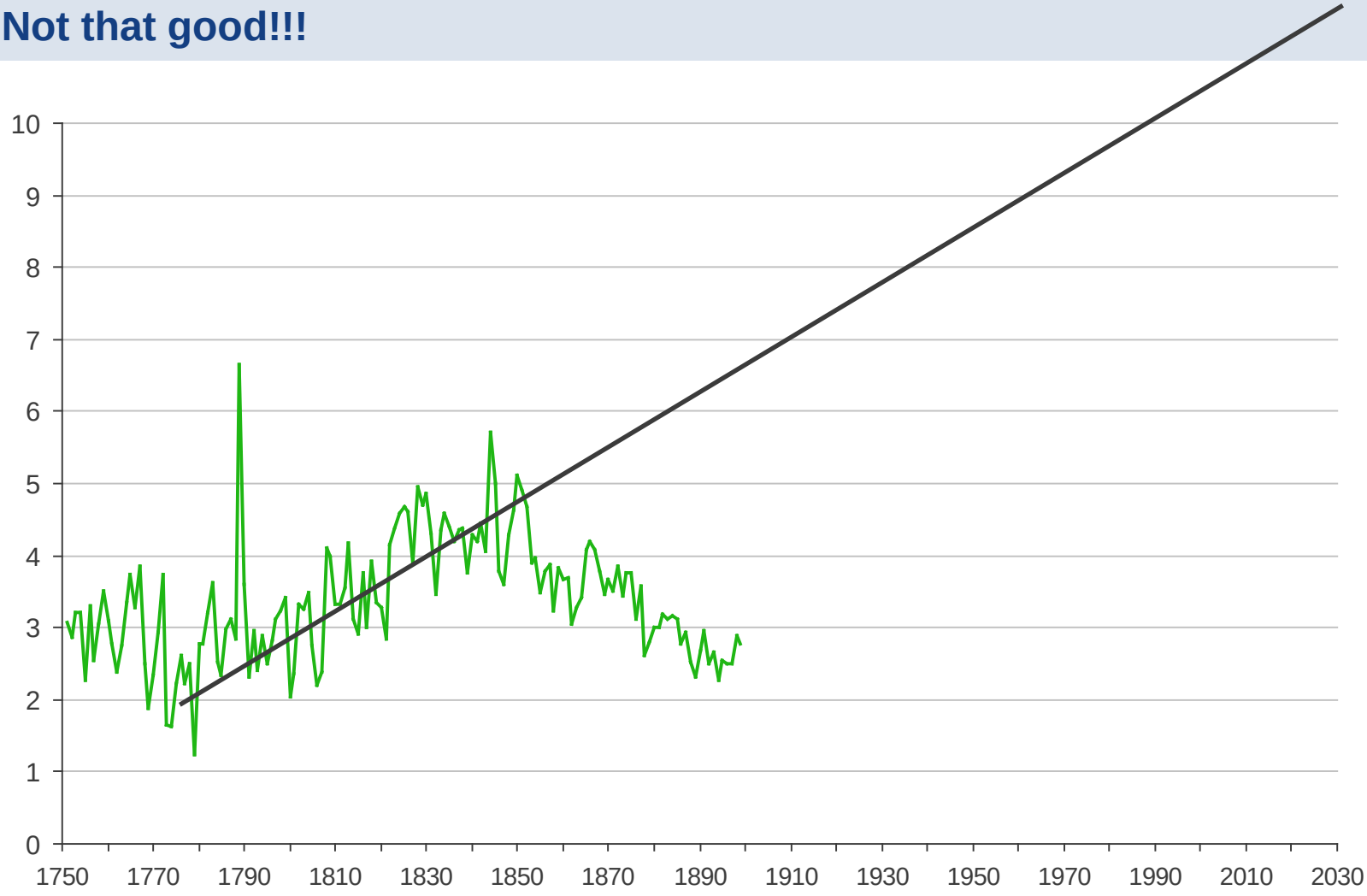
Projected value at 2030: 11.5



Source: Human Mortality Data Base

1900, the next generation of actuaries looks at the projection

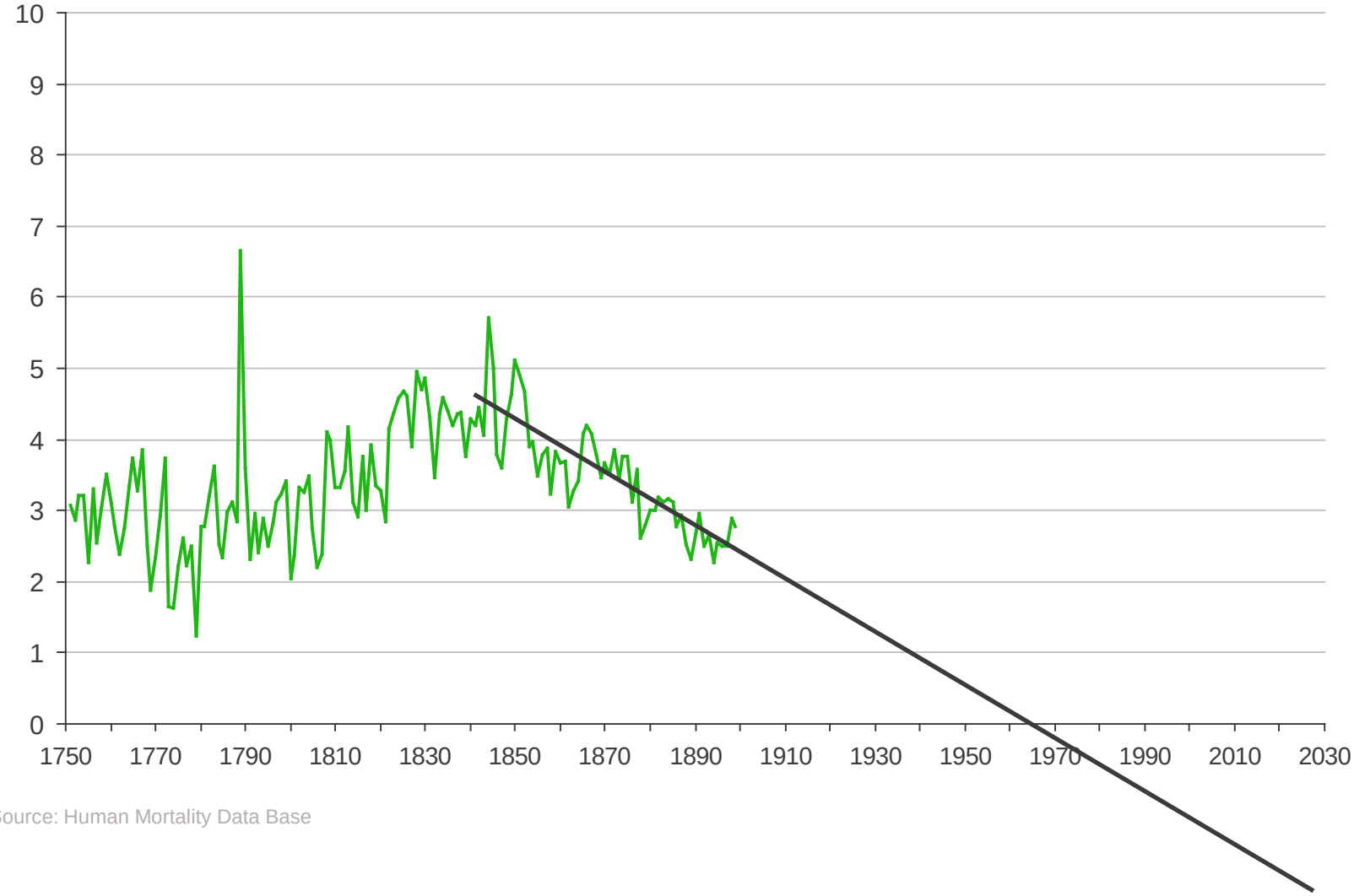
Not that good!!!



Source: Human Mortality Data Base

The 1900 generation of actuaries makes a new projection

Projected value at 2030: -2.5



Source: Human Mortality Data Base

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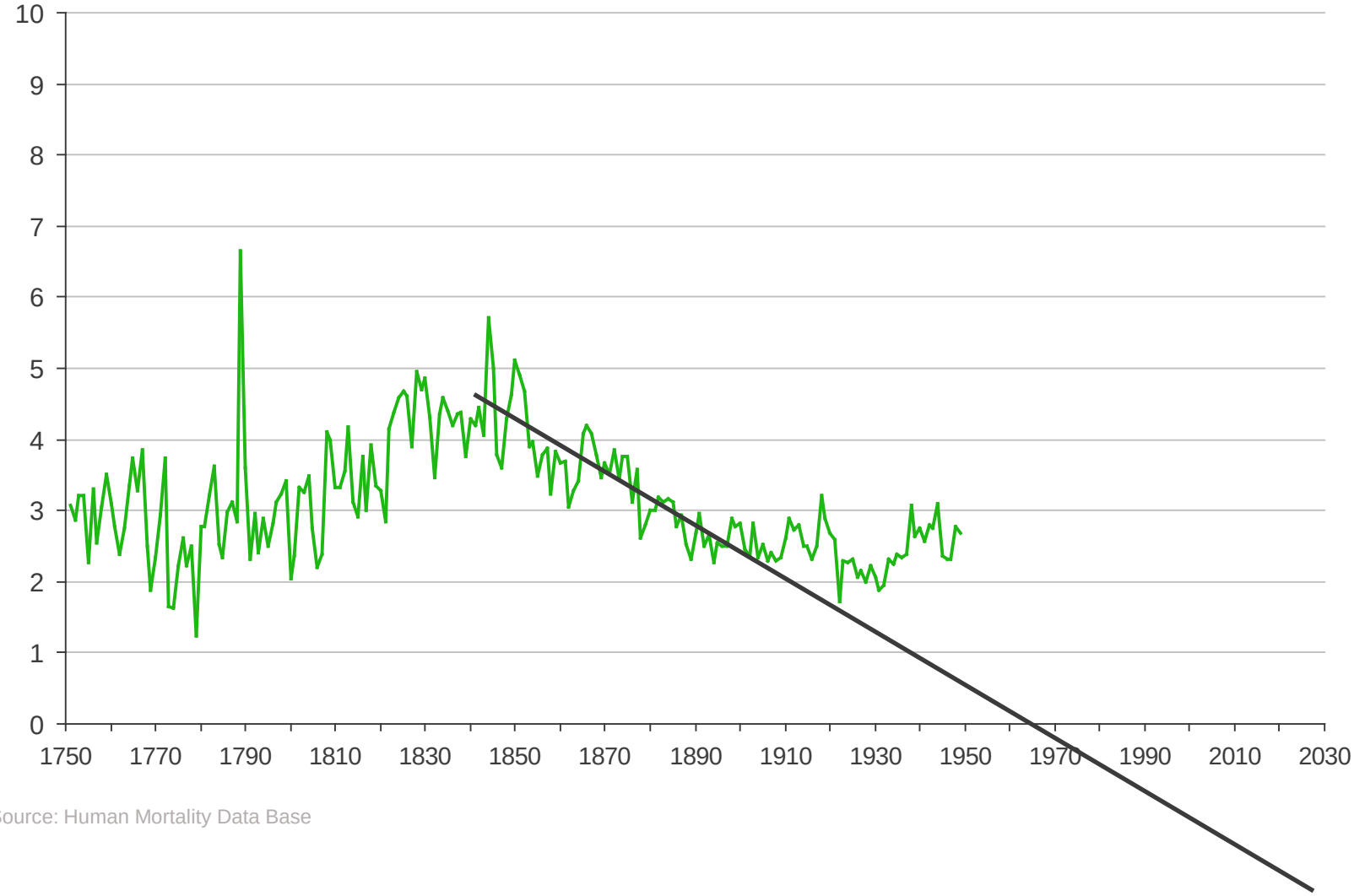
1950, the next generation of actuaries looks at the projection

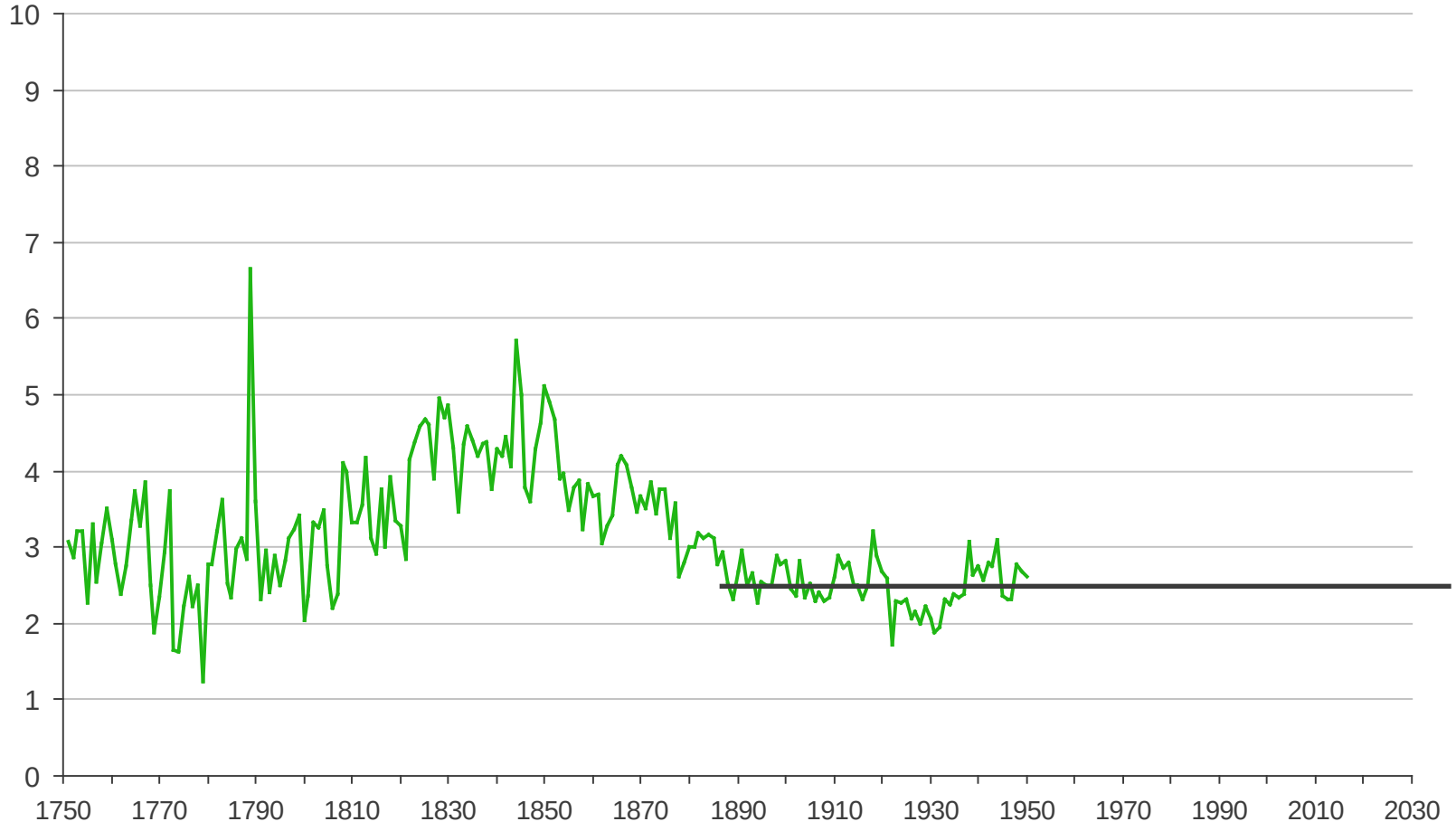
Not that good!!!



Source: Human Mortality Data Base

The 1950 generation of actuaries makes a new projection

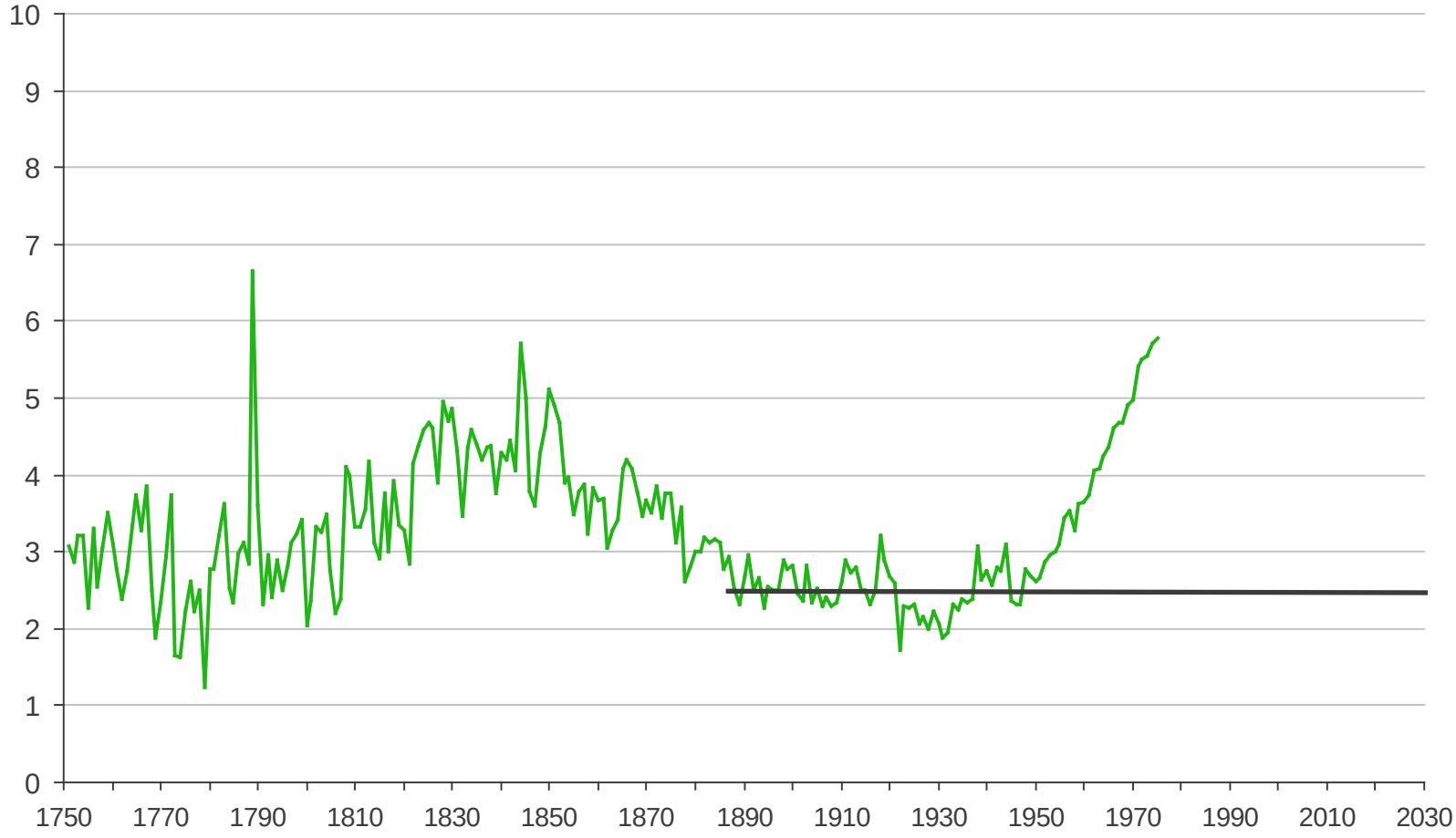
Projected value at 2030: 2.5



Source: Human Mortality Data Base

1975, the next generation of actuaries looks at the projection

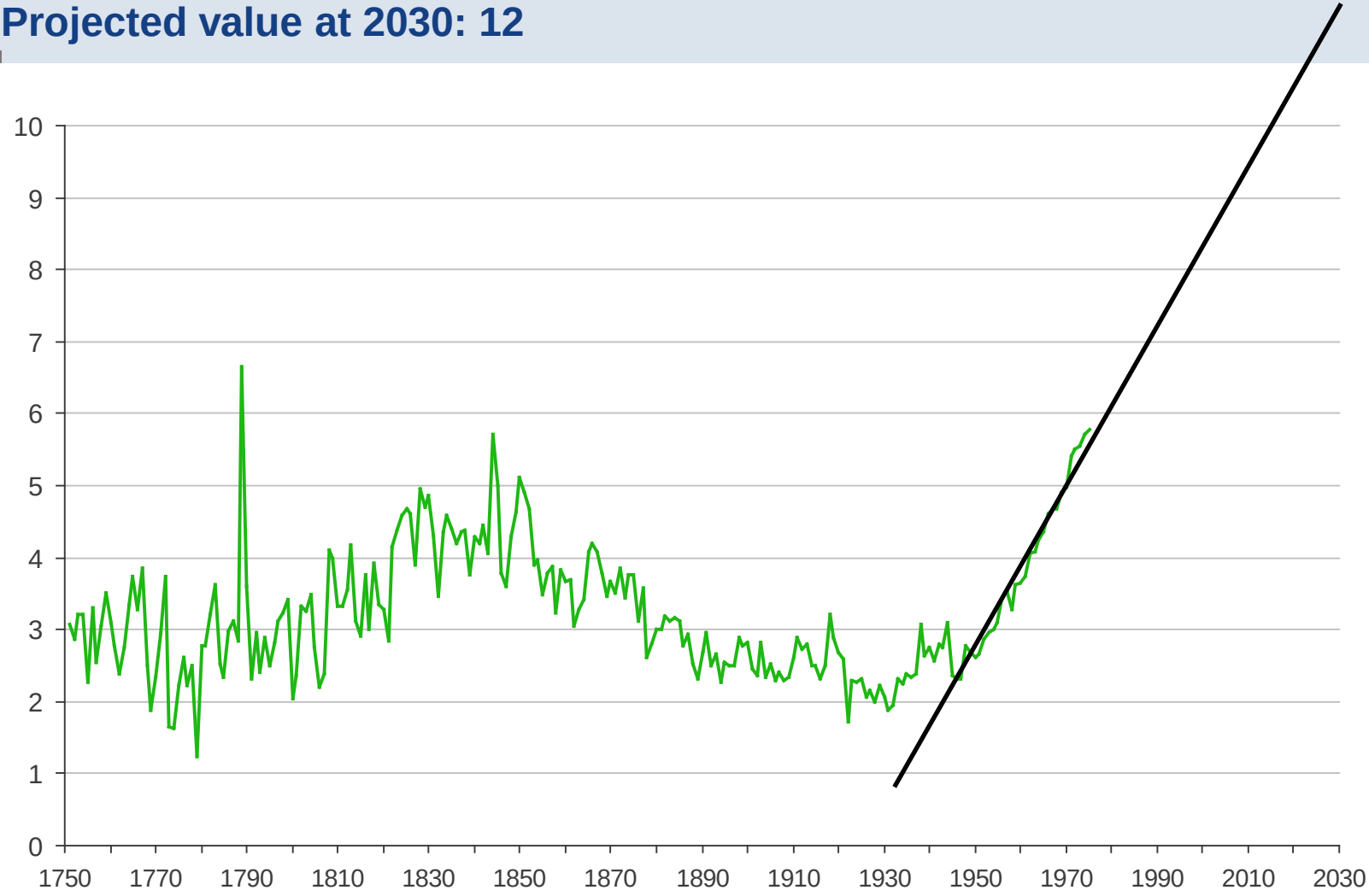
Not that good!!!



Source: Human Mortality Data Base

The 1975 generation of actuaries makes a new projection

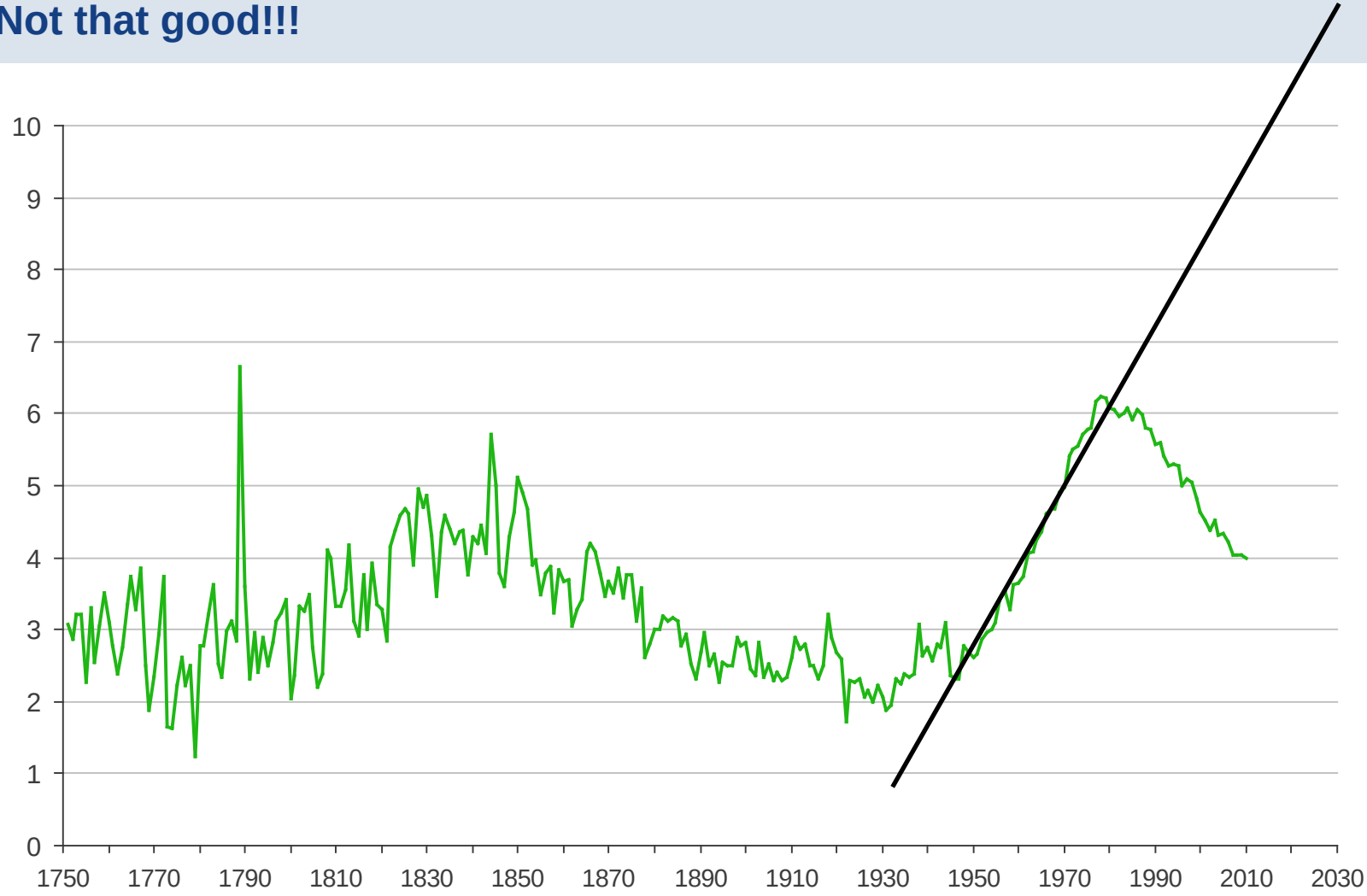
Projected value at 2030: 12



Source: Human Mortality Data Base

2010, the next generation of actuaries looks at the projection

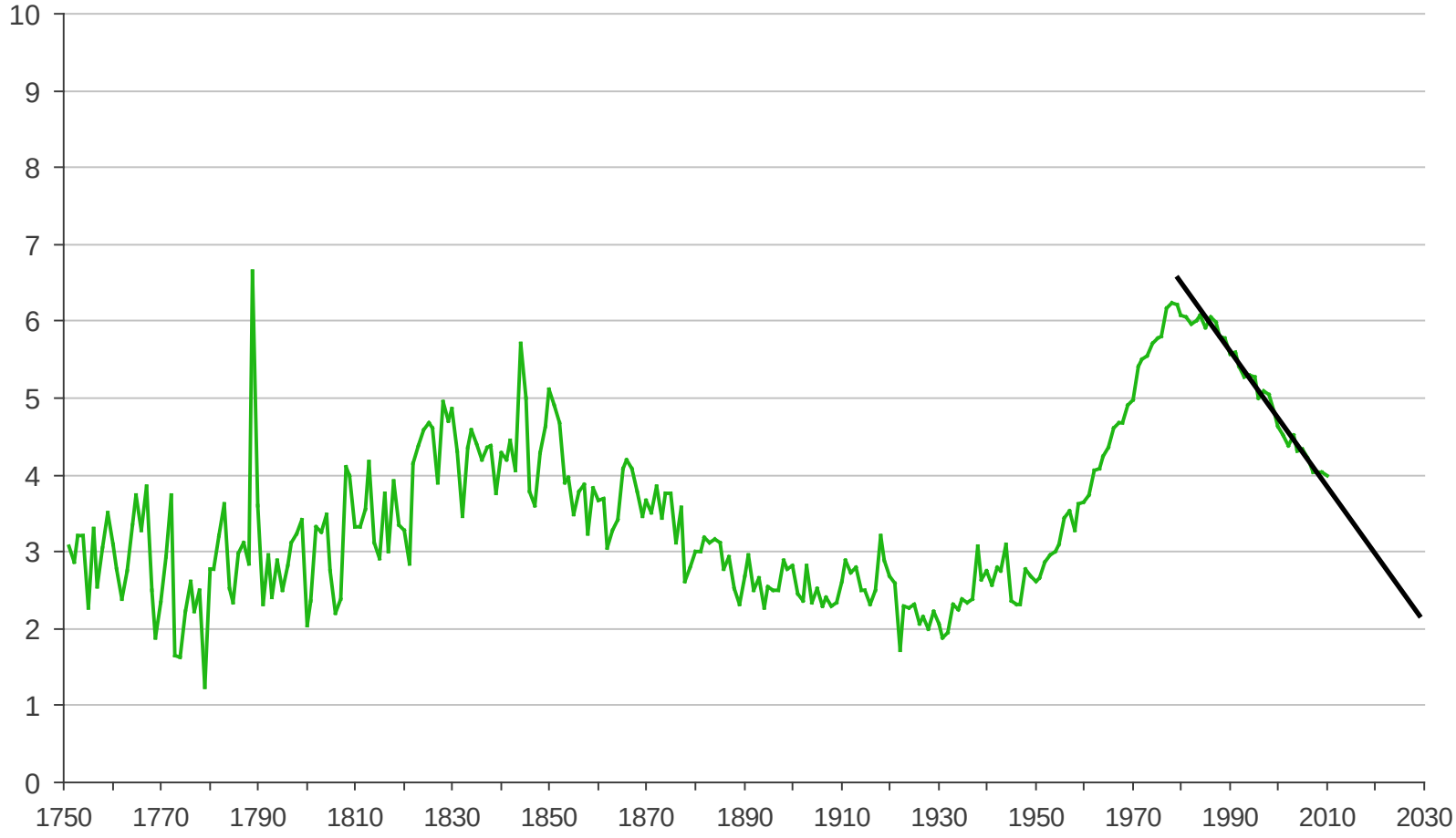
Not that good!!!



Source: Human Mortality Data Base

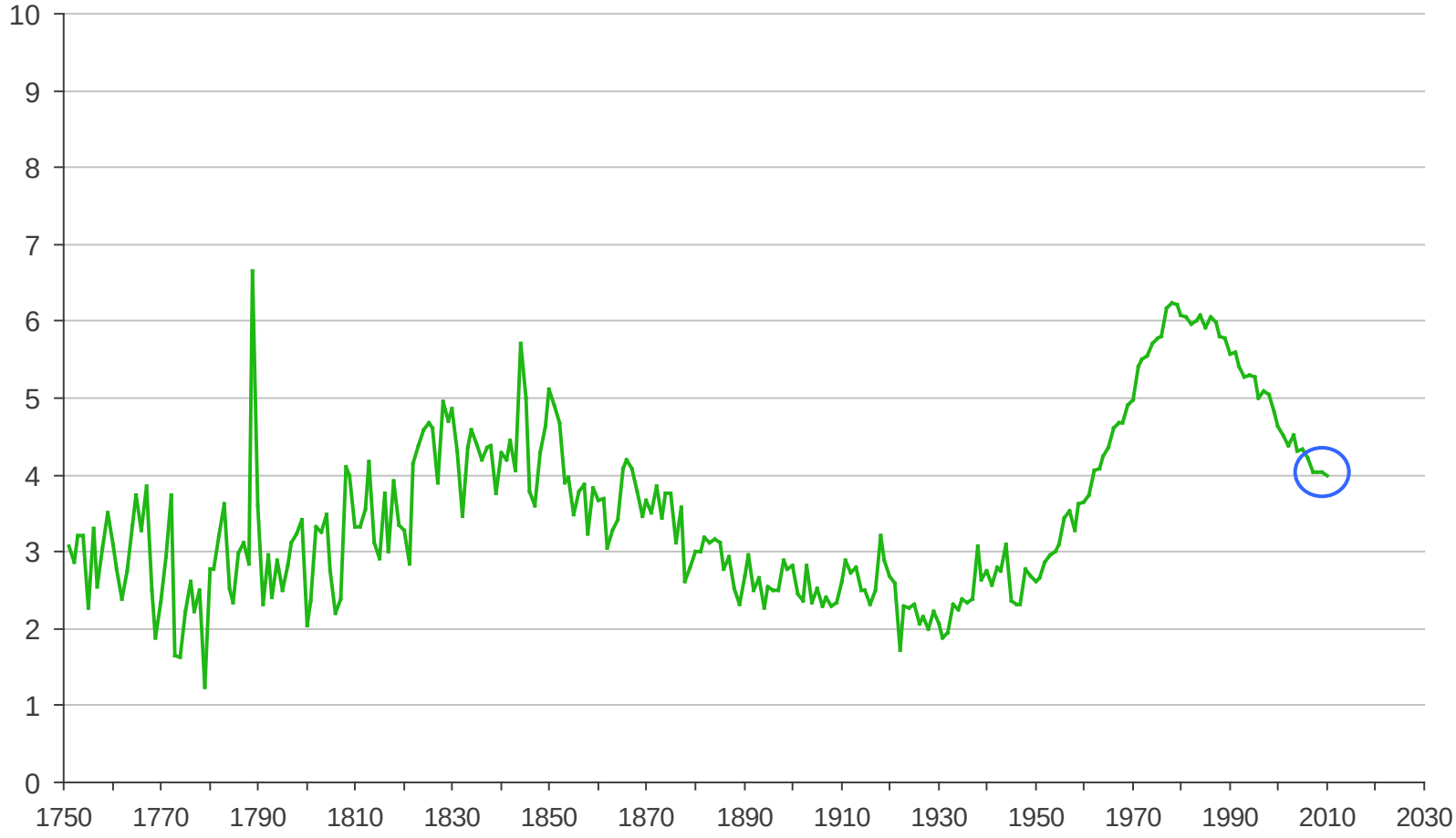
The 2010 generation of actuaries makes a new projection

Projected value: 2.1



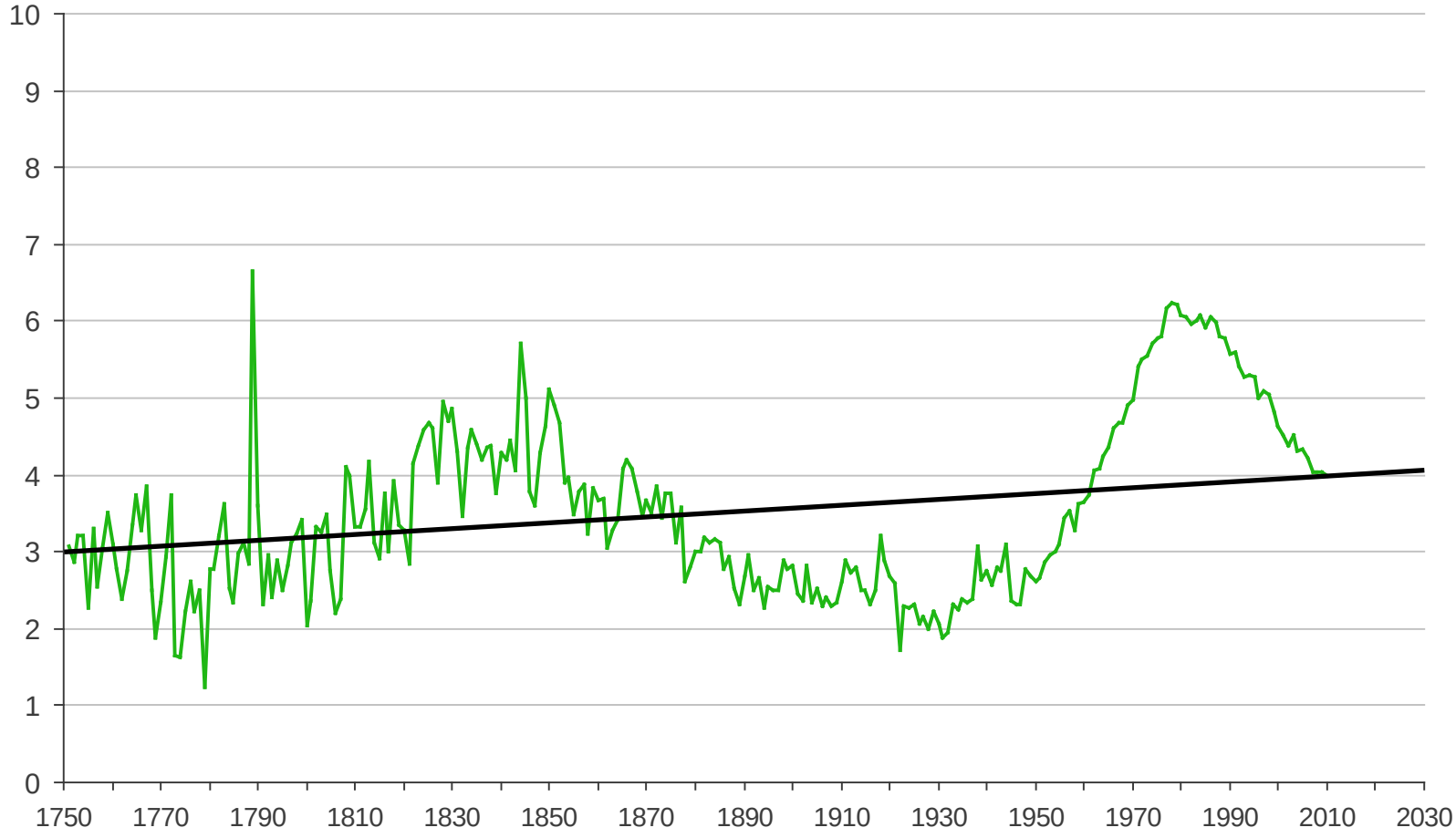
Source: Human Mortality Data Base

But
Change of trend the last three years??



Source: Human Mortality Data Base

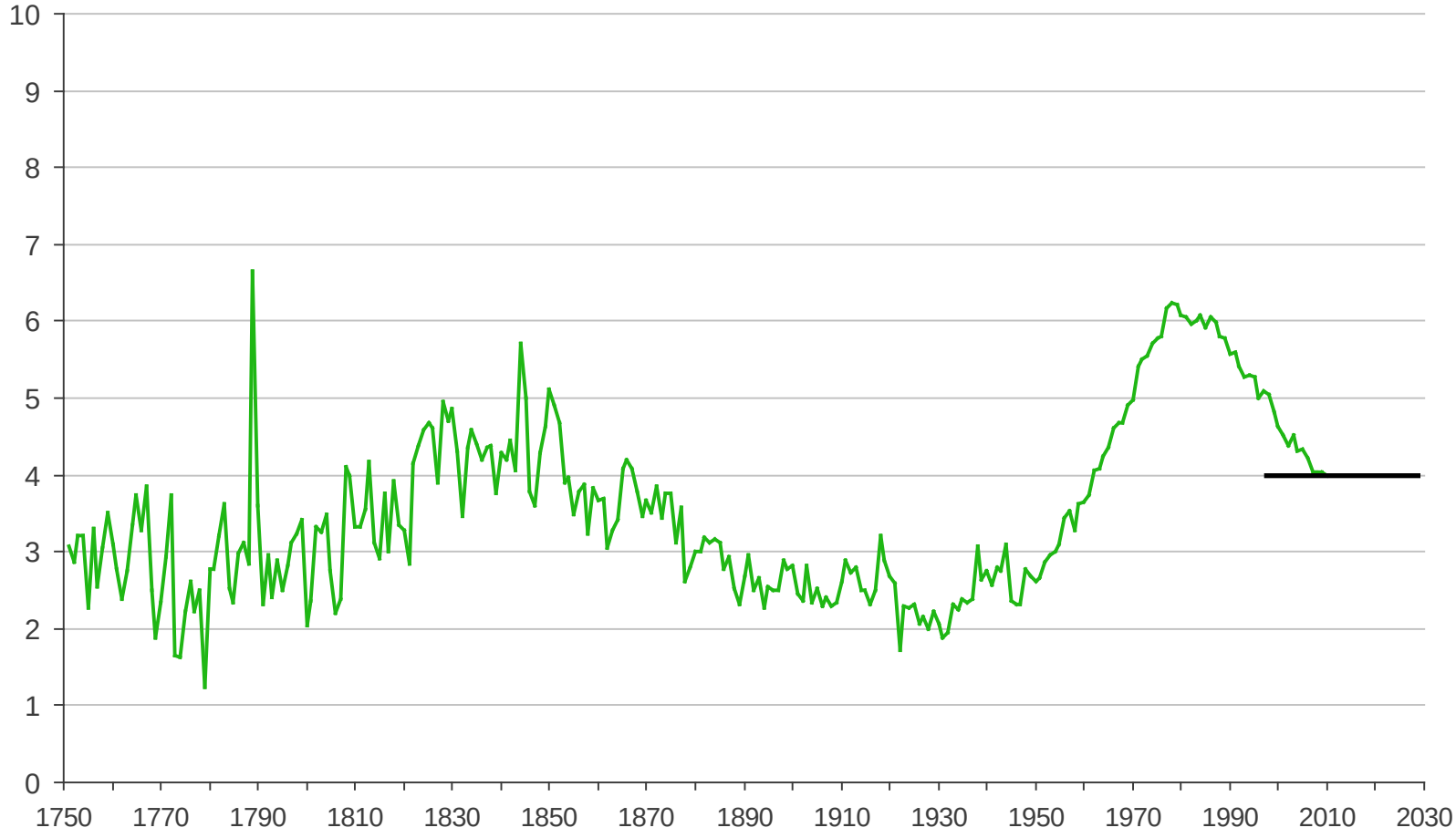
A possible projection
Projected value: 4.1



Source: Human Mortality Data Base

Another possible projection

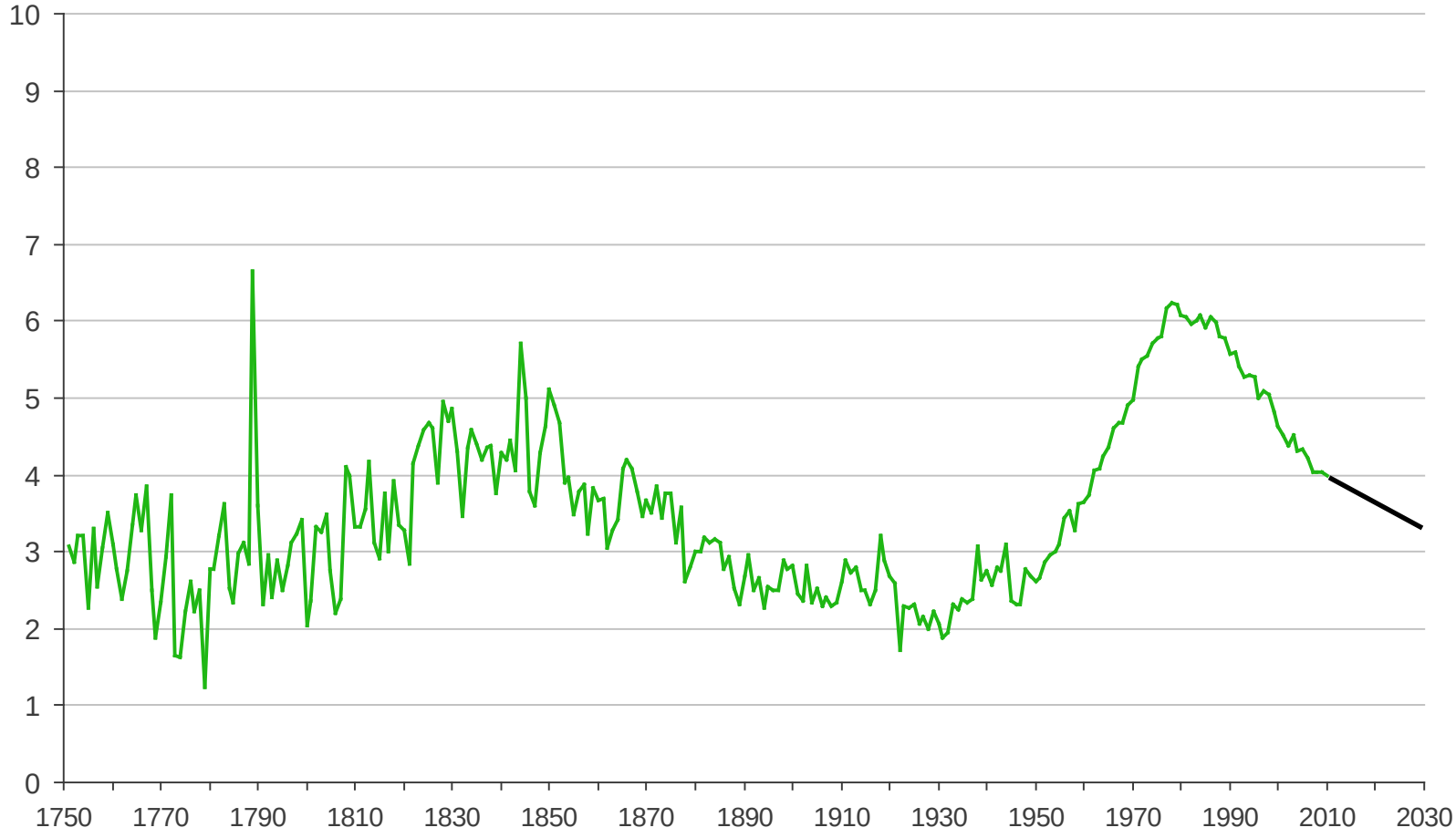
Projected value: 4.0



Source: Human Mortality Data Base

Another possible projection

Projected value: 3.2 (the long term average)



Source: Human Mortality Data Base

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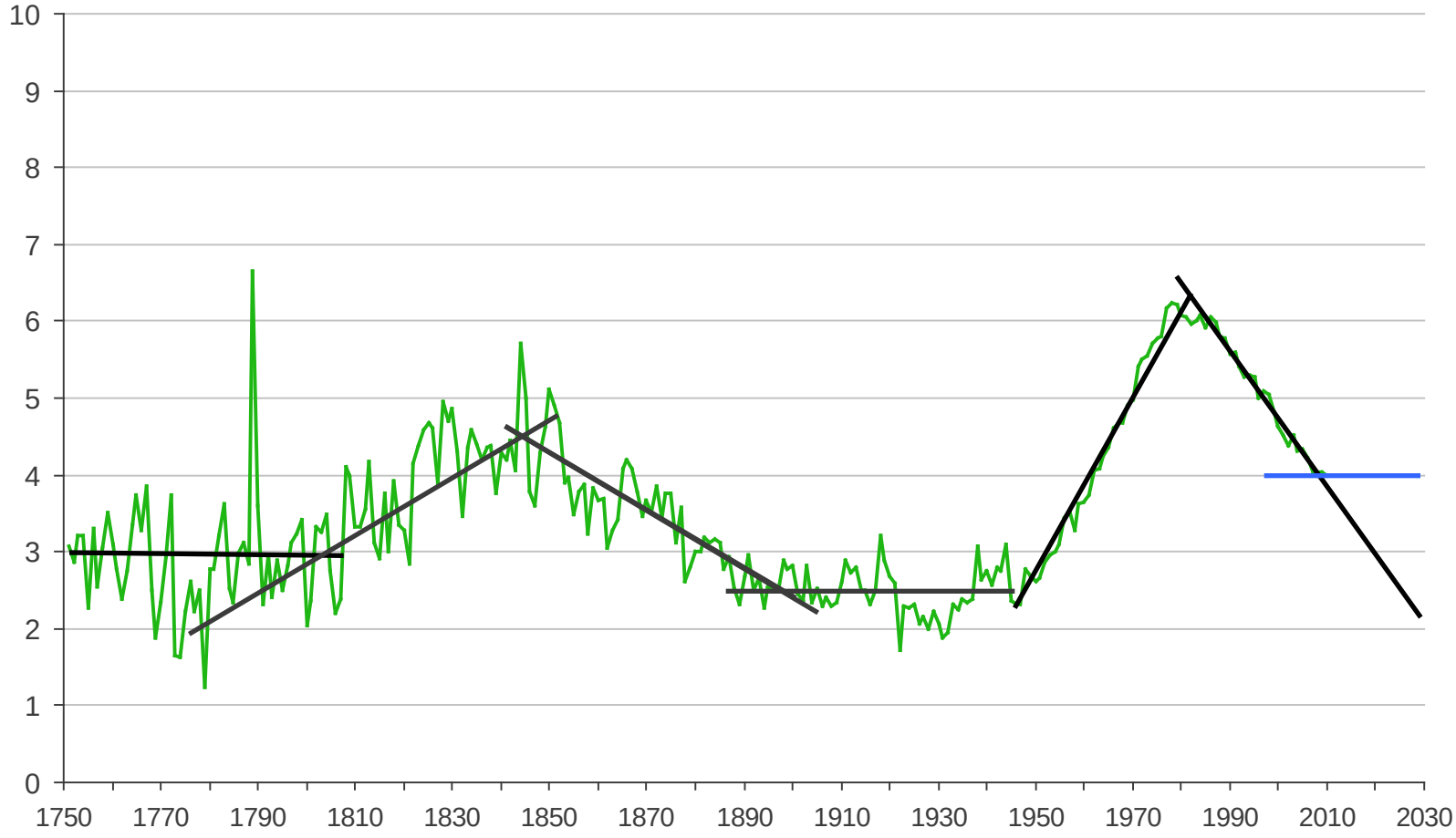
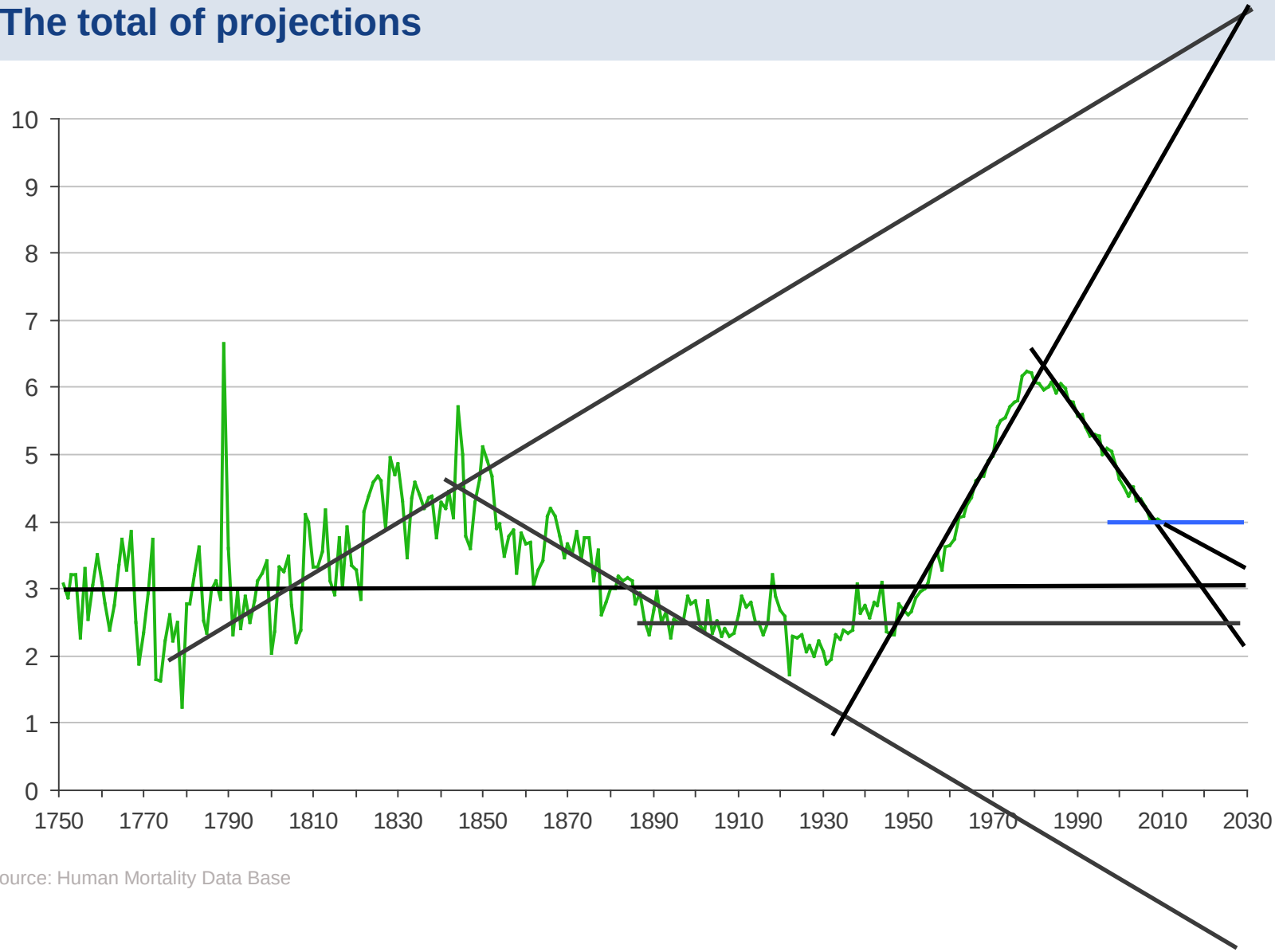
1751-2010
Trend patterns



Source: Human Mortality Data Base

1751-2010
The total of projections



Source: Human Mortality Data Base

Conclusions

- Trends shift
- Long term projections from short term data is dangerous
- We have a reversion to the mean
- We should not expect the difference in longevity to reach zero
- The gender problem will not disappear by itself

The end