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Longevity/Mortality Index Trading: From Theory to Practice

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Introduction

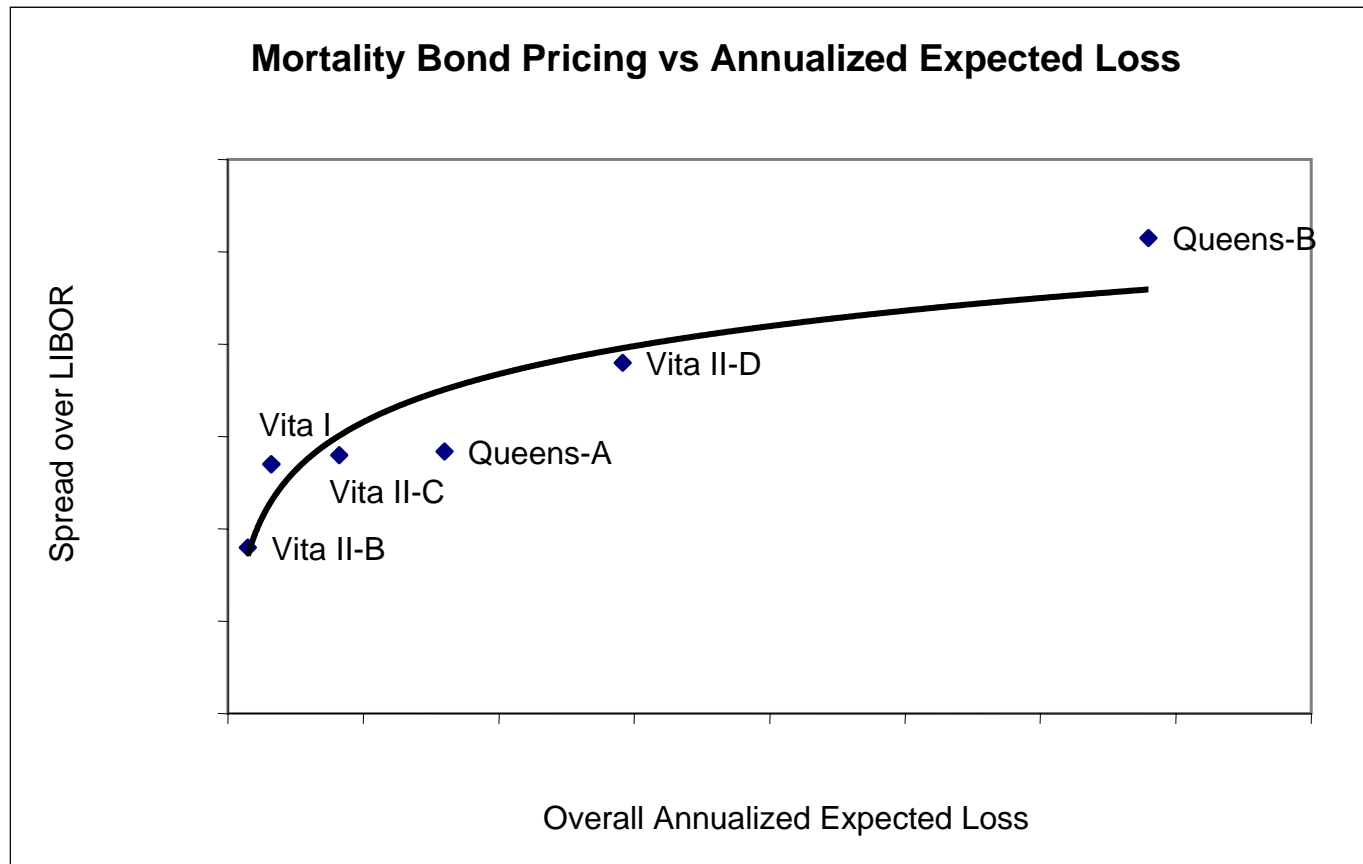
- ▶ **Mortality is a risk that is generally stable but subject to rare spikes**
 - Reliable data exists for at least a decade in most OECD countries (more in the US)
 - Mortality in the US has generally improved over the past several years

- ▶ **Insurers and reinsurers have historically traded “in-the-money” mortality**
 - “Closed block” and insurance company acquisitions
 - Mortality levels based on specific pricing
 - Current tightening of the reinsurance and retro markets has forced insurers and reinsurers to consider capital market alternatives

- ▶ **Insurers are seeking to lay off catastrophe mortality risk to investors**
 - Catastrophic reinsurance markets have seen some dislocation with bird flu concerns
 - Swiss Re successfully distributed two “Vita” transactions (2003, 2005)
 - Other forms of exposure to mortality risk are available to investors through XXX securitizations and life settlement transactions, for example

Pricing Model for US Mortality Bonds Executed to Date

► Pricing for mortality bonds issued against an index has been more predictable than pricing on embedded value securitizations, most likely owing to greater clarity about expected losses



Credit Suisse Longevity Index

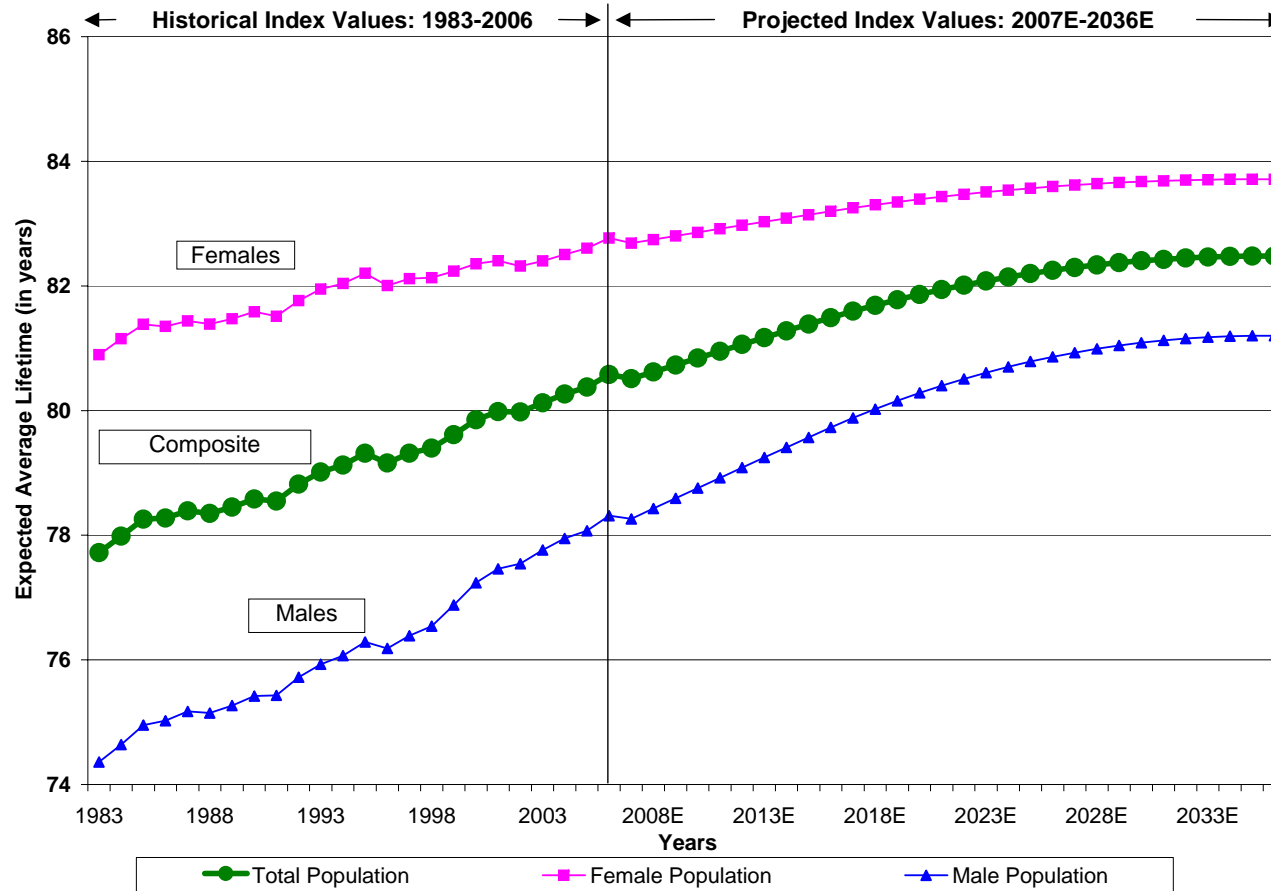
Credit Suisse Longevity IndexSM

- ▶ Objective, transparent, and consistent source of Expected Average Lifetime and mortality rate data based on publicly available statistics
- ▶ Index values, underlying mortality rates or cumulative survival rates serve as a basis to settle longevity and mortality based transactions
- ▶ Government published national death statistics
- ▶ Calculation Agent for the Index is Milliman, a global actuarial firm
- ▶ Provides both historical and projected Index Values and underlying mortality rates
- ▶ Released annually on Credit Suisse's website and Bloomberg News Service
- ▶ Available at www.csfb.com/institutional/longevityindex or on Bloomberg terminals: LIFF GO

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Credit Suisse Longevity IndexSM



- Index represents Expected Average Lifetime
- Index exists for Males, Females, and a Composite of both genders
- Sub-indices created for ages: 50, 55, 60, 65, 70, 75, 80
- Based on lagged data (24-26 month lag)
- Index calculated from underlying mortality rates

Potential Uses of the Credit Suisse Longevity IndexSM

Hedge mortality risks and longevity risks

- Insurers enter into transactions that provide opposite risk profile of insured book
- Purchaser retains basis risk between insured and general population
- Catastrophe mortality bonds

Take view on direction of longevity/mortality experience

- Investors buy instruments where the total return is tied to longevity/mortality
- Gain “synthetic” exposure to longevity/mortality
- Offers uncorrelated asset performance

Monetize embedded mortality/longevity gains

- Insurers receive payments today for expected gains from improved mortality
- Pension plan sponsors (annuity writers) receive value today for expected longevity gains
- Investors can buy the expected mortality/longevity upside
- Such “gains” determined with reference to Longevity IndexSM

Case Study I: “In-the-money” Transactions

Structural Overview of Current Products

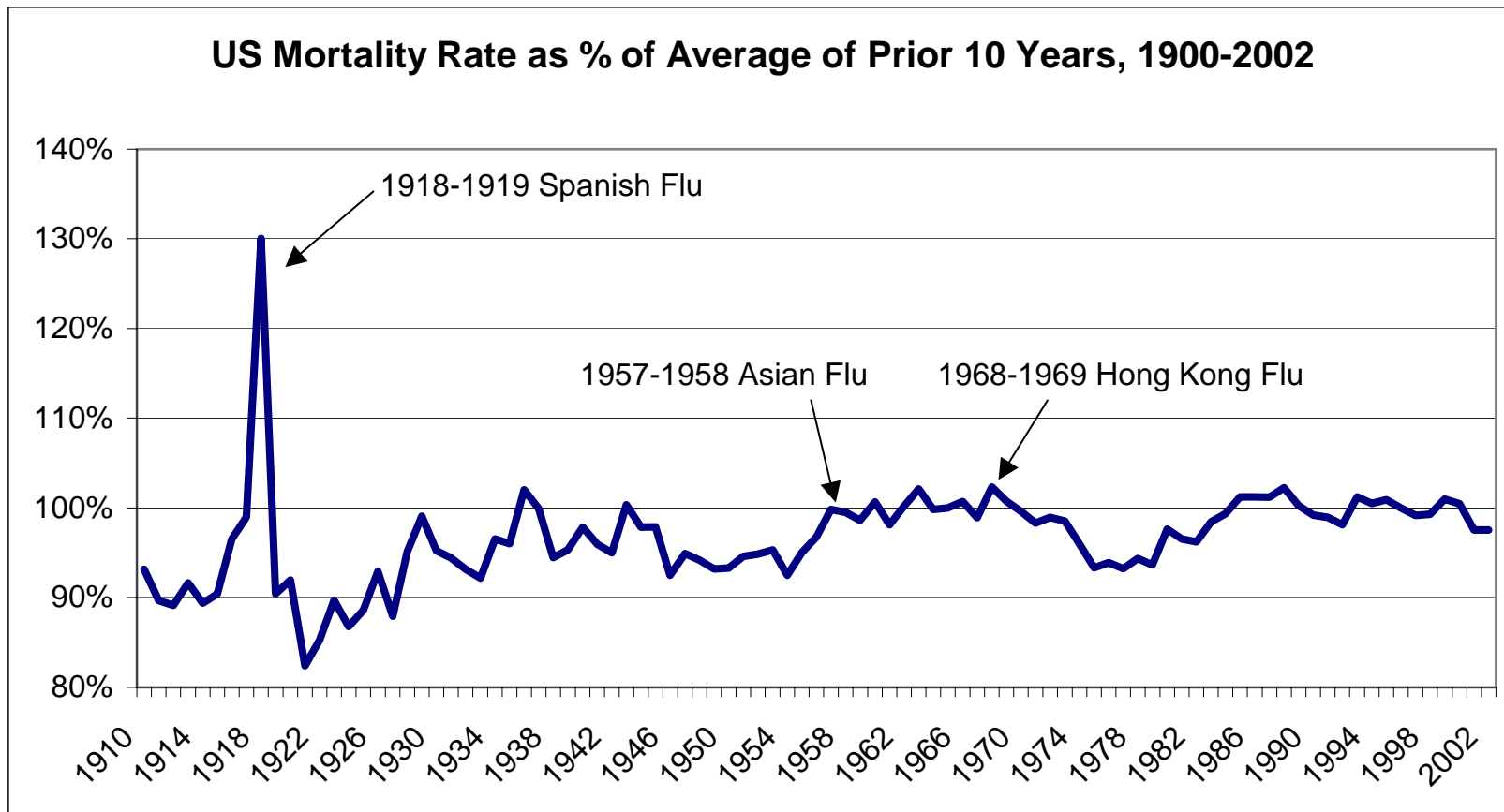
- ▶ Credit Suisse has developed Longevity and Mortality Structured Instruments - Notes and Swaps
- ▶ Longevity Structured Instruments
 - Settle on cumulative survival rates
- ▶ Mortality Structured Instruments
 - Settle on mortality rates
- ▶ Longevity and Mortality Instruments are not simply inverses of each other
 - Investors can take long or short positions in either note
- ▶ The table below outlines the position needed in each note for a desired outcome

	INVESTOR'S DESIRED OUTCOME:	
Note selection	Position to take for gain on longevity	Position to take for gain on mortality
Longevity Notes and Swaps: Settle on cumulative survival rates (CSRs)	Long Want CSRs to be higher than expected	Short Want CSRs to be lower than expected
Mortality Notes and Swaps: Settle on mortality rates	Short Want mortality rates to be lower than expected	Long Want mortality rates to be higher than expected



Case Study II: “Out-of-the-money” Transaction

US Mortality is Stable



Source: US Center for Disease Control and Credit Suisse

Catastrophic Mortality Risk

Objectives

- ▶ Hedge against a catastrophic event such as a flu pandemic
- ▶ Respond to increased rating agency focus on enterprise risk management

Solutions

- ▶ Reinsurance
 - Expensive at about 5 - 10% rate on line (Premium/Exposure)
 - Excludes all major perils
 - Limited capacity
- ▶ Capital Markets Solution
 - Investors compensated for accepting low probability, highly diversified risk
 - High mortality attachment points (e.g. 110-120% of base mortality)
 - Millions of lives across multiple geographies
 - Spreads are wide relative to comparable credit expected losses

Longevity IndexSM Disclaimers and Data Sources

The Credit Suisse Longevity IndexSM (the “Index”) has been prepared based on assumptions and parameters that reflect good faith determinations as of a specific time and are subject to change. Those assumptions and parameters are not the only ones that might reasonably have been selected or that could apply in connection with the preparation of the Index or an assessment of a transaction or product referencing or otherwise utilizing the Index or its components. A variety of other or additional assumptions or parameters, or other factors and other considerations, could result in a different contemporaneous good faith composition or calculation of the Index. The Index has been obtained from and based upon sources believed by Credit Suisse Securities (USA) LLC (“CSS”) to be reliable, but CSS does not represent or warrant its accuracy or completeness. The Index does not purport to contain all of the information that an interested party may desire. Actual results or performance may not match or have any correlation to the Index. The Index is not intended to supplement or replace actuarial data and should not be used as such. CSS has no obligation to take the needs of a party entering into, buying or selling a transaction or product referencing or otherwise utilizing the Index or its components into consideration with respect to the composition or calculation of the Index. In all cases, interested parties should conduct their own investigation and analysis of a transaction or product referencing or otherwise utilizing the Index or its components. Each person viewing the Index should make an independent assessment of the merits of pursuing a transaction or product referencing or otherwise utilizing the Index or its components and should consult their own professional advisors. CSS is not acting in the capacity as a fiduciary or financial advisor. CSS or its employees or affiliates may enter into, buy or sell transactions or products referencing or otherwise utilizing the Index or its components.

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Data Sources:

U.S. Department of Health and Human Services (U.S. DHHS), Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS): Deaths by Single Years of Age, Race, and Sex: United States, 1980-2002

U.S. Census Bureau: National Population Estimates, Monthly Postcensal (2000-2002) and Intercensal (1980-1999) Resident Population, by single year of age, sex, race, and Hispanic origin

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