Demography and Low-Frequency Capital Flows

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June2013

Plan of the discussion

- This paper: Capital flows have a persistent low frequency component. Can we understand this via a model of demography and the economy?
- More demography
- More demography in portfolio decision

Projecting future population

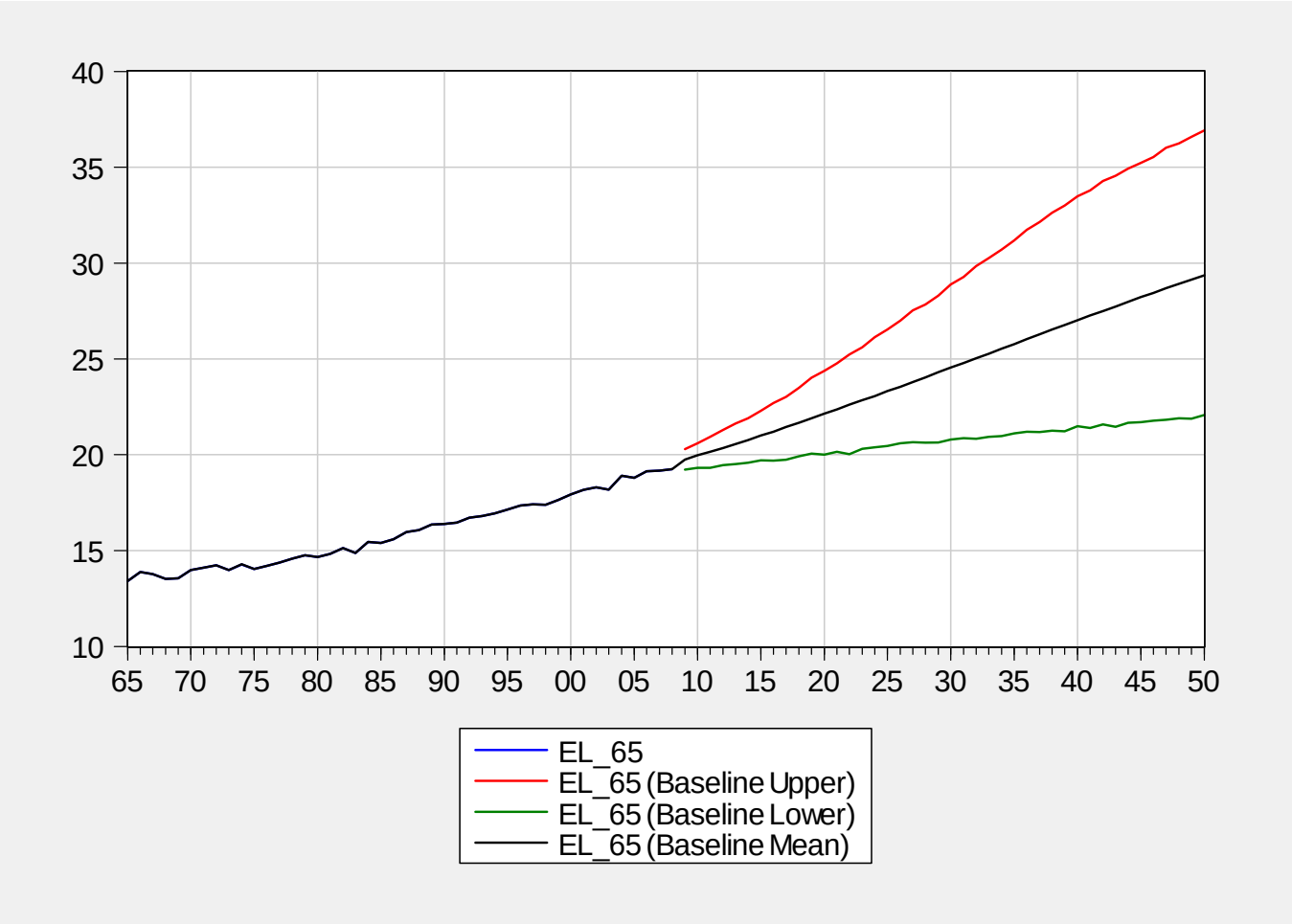
The Lee-Carter forecasting model

- Central mortality rate $q_{x,t}$ of age cohort x at time t evolves to the following equation

$$\begin{aligned} \ln(q_{x,t}) &= \alpha_x + \beta_x k_t + \varepsilon_{x,t} \\ k_t &= \gamma_0 + \gamma_1 k_{t-1} + \varepsilon_{k,t} \end{aligned}$$

- k_t is a (unobservable,estimated) mortality index equal for all age cohorts and reflecting the overall decrease in mortality
- Identification is achieved by imposing the restrictions $\sum_t k_t = 0$ and $\sum_x \beta_x = 1$

Mortality rates' projections, 65-years, 2012-2050



Life expectancy at 65

The typical equilibrium path for interest rates

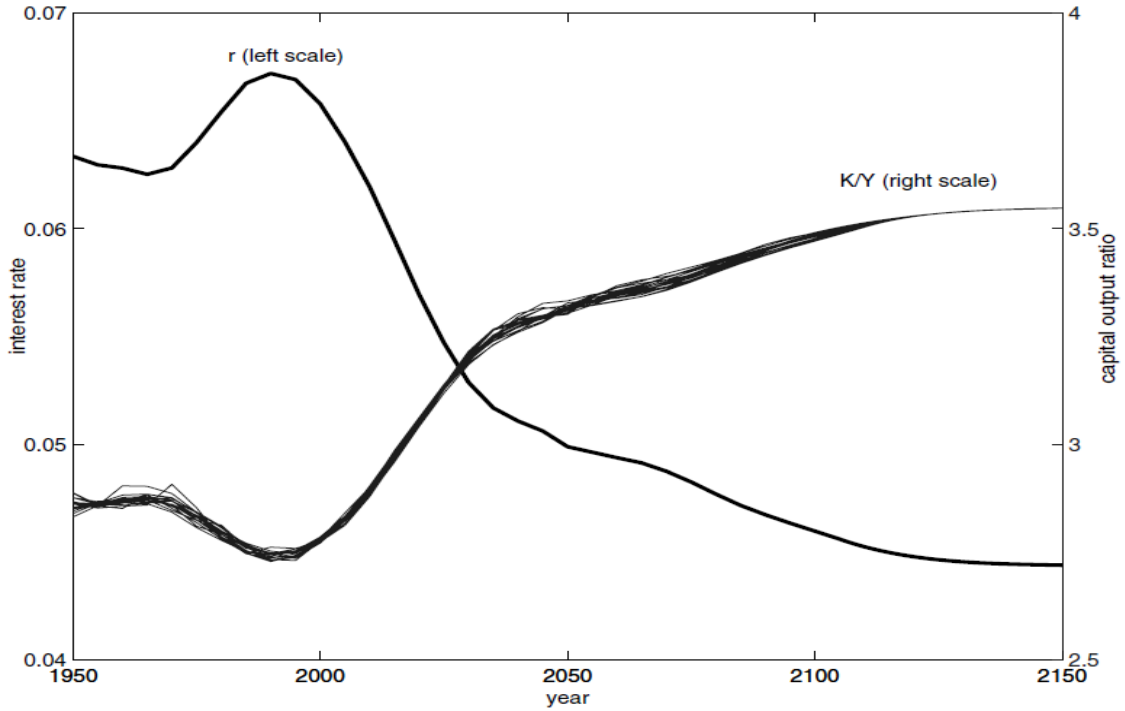
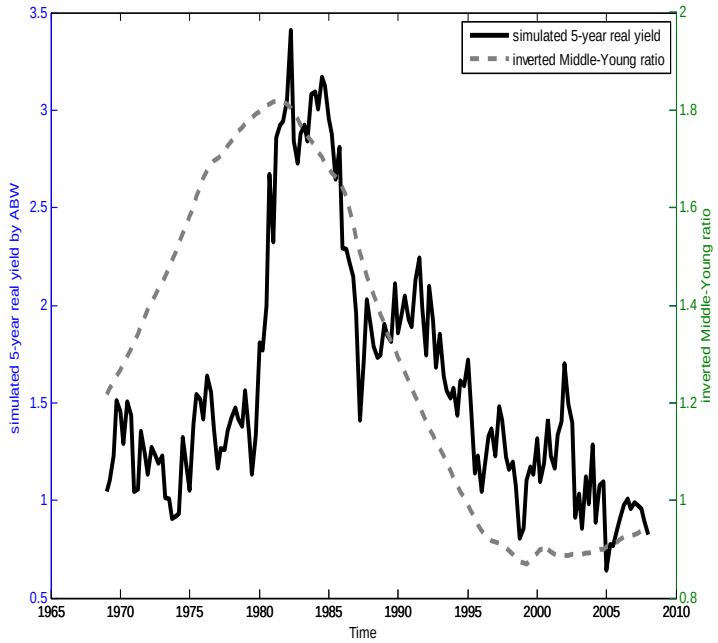


FIGURE 1

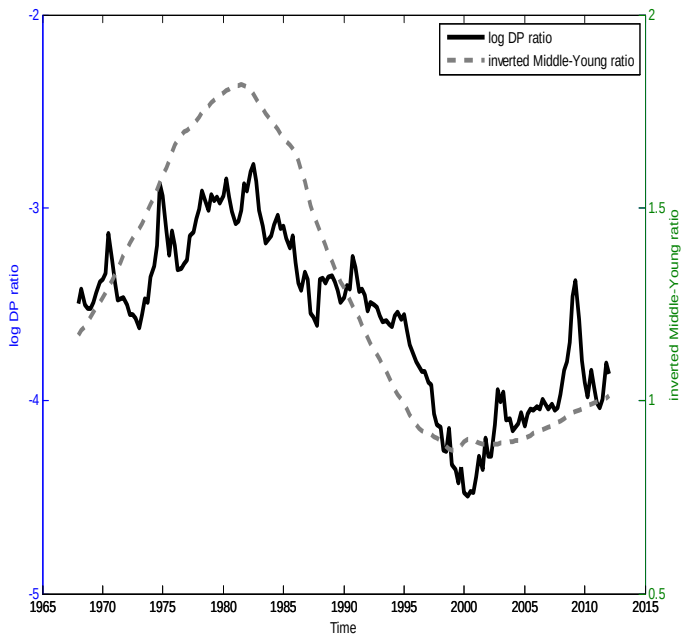
ANNUALIZED INTEREST RATE PATH AND ANNUALIZED CAPITAL–OUTPUT RATIOS

Domej-Floden (IER, 2006) "As the fraction of prime-age workers falls, the productivity of capital and hence the interest rates declines and the capital ouptut ratios increases".

Age-Structure and financial assets returns in the U.S. data



US 5-year real yield (Ang, Bekaert and Wei(2008), left-scale) and MY (inverted, right-scale). Sample: 1967Q4-2007Q4.



the US (log) dividend-price ratio (left-scale) and middle-aged young ratio, MY (inverted, right-scale). Sample: 1967Q4-2011Q4.

The GMQ model

- Consider an OLG exchange economy with a single good (income) and two types of financial instruments, a riskless bond, available in zero net supply and paying one unit of income per period, and a risky asset, an equity contract, which is an infinitely lived security available in positive net supply that pays a dividend each period.
- The financial instruments allow agents to redistribute income over time three periods of their life, in which they are respectively young, middle-aged, and retired. Each agent (except retirees) has an endowment and labor income w= $(w^y, w^m, 0)$.
- The model assumes a given age structure of the population according to which in *odd (even)* periods a large (small) cohort N(n) enters the economy, therefore in every odd (even) period there will be {N,n,N} ({n,N,n}) cohorts living
- When the MY ratio is large, there will be excess demand for saving by a large cohort of middle-aged and for the market to clear, equilibrium prices of financial assets should adjust, i.e. increase .