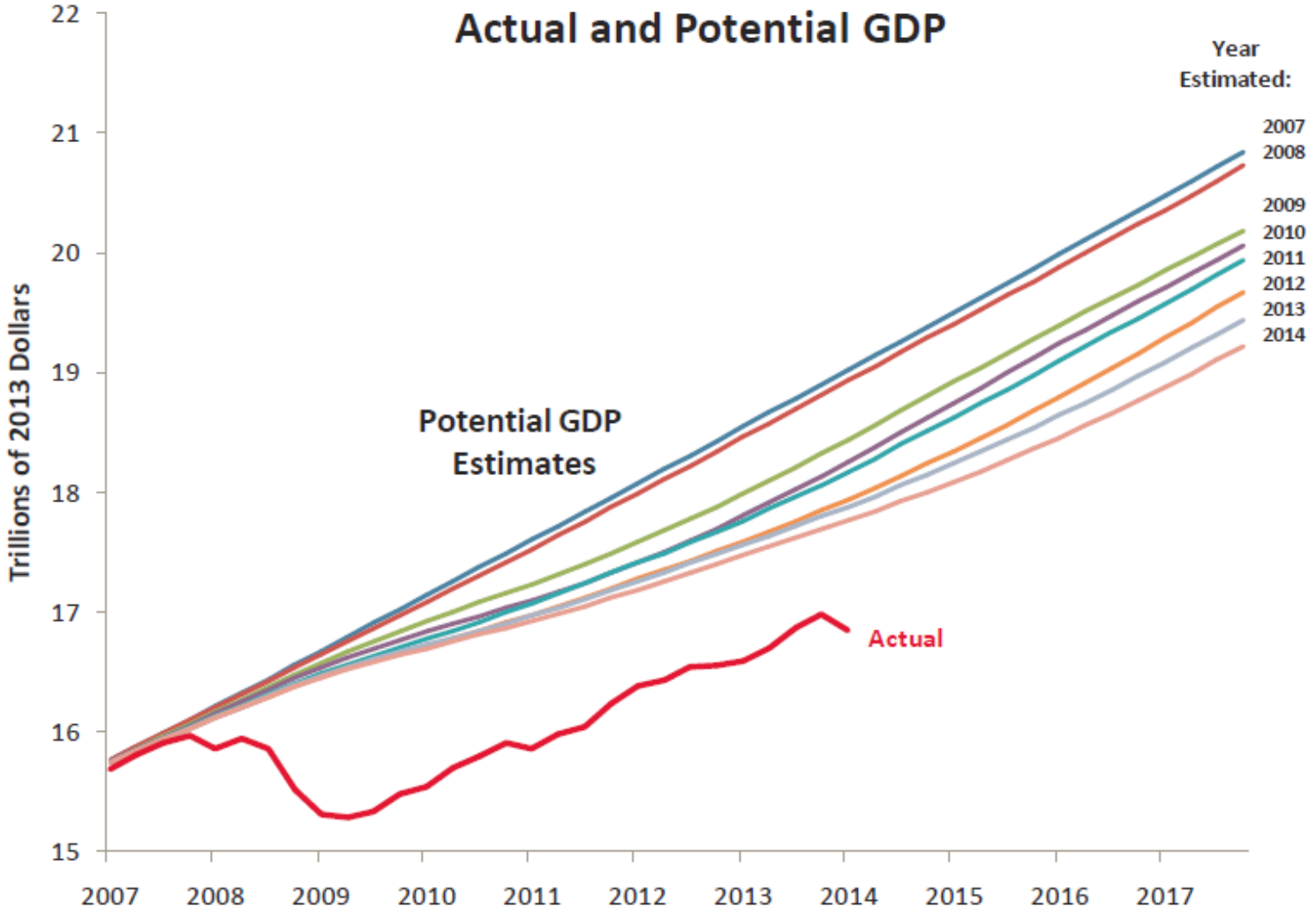
Discussion of "Demographic Dynamics and LR Development" by Cervallati, Sunde, & Zimmermann

Raquel Fernández

NYU, CEPR, NBER, ESOP, IZA

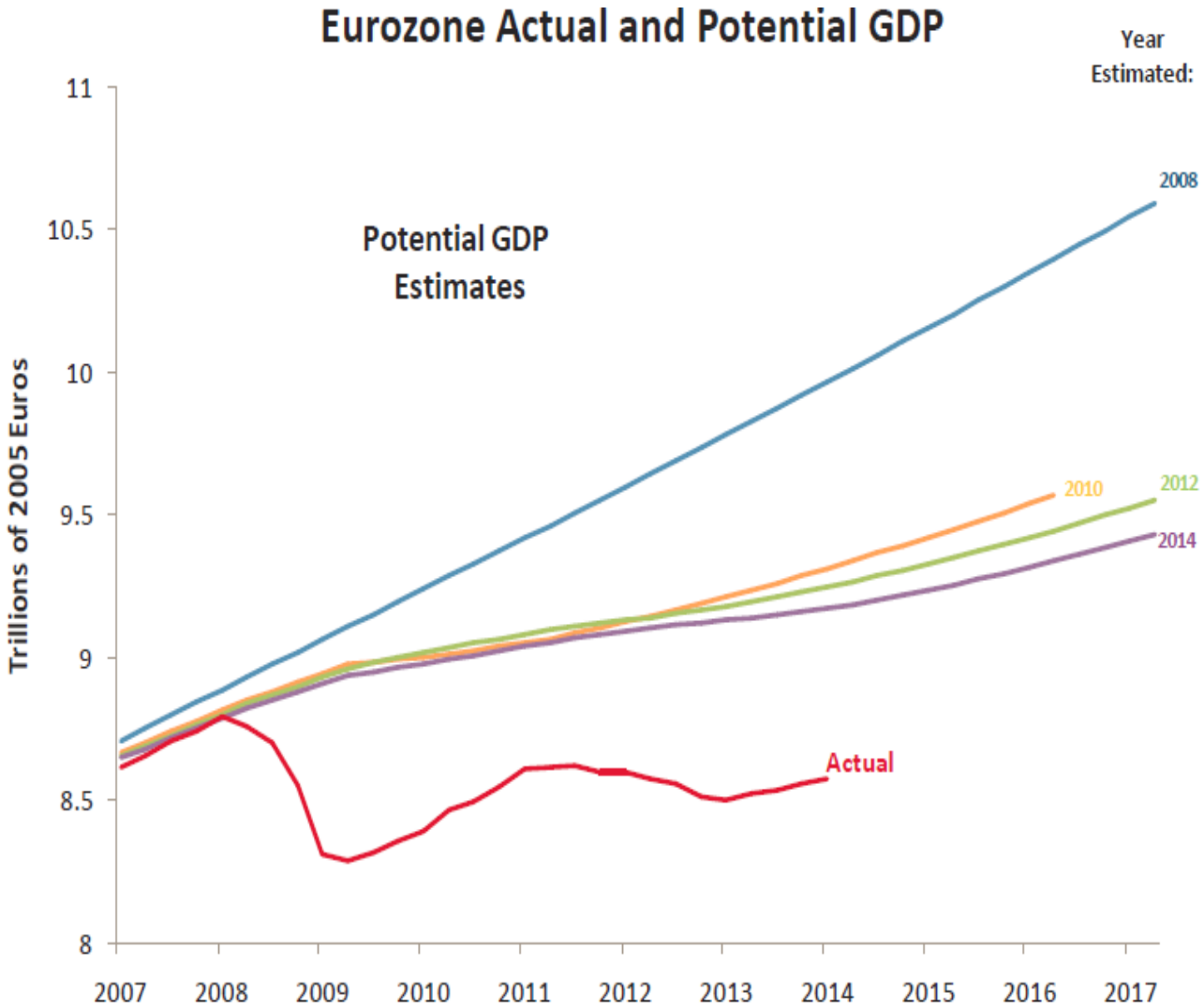
19 June 2015

Motivating picture: US



Sources: Congressional Budget Office, Bureau of Economic Analysis.

Motivating picture: Eurozone



Sources: IMF World Economic Outlook Databases, Bloomberg.

Secular Stagnation

- Two views
  - $y < y^*$
  - y^* has dropped
- For the $y < y^*$ camp:
  - failure of AD
  - negative real rates required to restore full employment and attain y^*
  - main challenge is to monetary policy from operating at the ZLB and periodic bubbles
  - appropriate policy intervention: higher inflation target and/or fiscal policy
- For the y^* has dropped camp
  - failure of AS: $\downarrow$ pop growth rate, $\uparrow$ inequality, $\downarrow$ growth rate of productivity
  - not necessarily something policy should address
- Much of the discussion is very loose: a theoretical framework is useful
  - Eggertson & Mehrotra (2014): credit constraints in model with clear AD and AS of savings by individuals at different stage of life cycyle
  - CSZ (2015): endogenous $\downarrow$ demographic dynamics and its consequences

Why this paper?

- Contribution of paper: use a theoretical framework (CS (2015)) to think about how endogenous demographics generate "secular stagnation"
- Implicit thesis: growth slow down is natural outcome of end of demographic transition
- Series of empirical exercises with objective of convincing reader that this view has support from the data

Main Comments/Questions

- *Paper should be much more explicit about the model*, the main assumptions, and how the transition path is generated
- *The paper should rely on the model to specify the empirical analysis*
  - Some regressions control for per capita GDP, some for per capita capital, some for neither. Why?
  - What is endogenous/exogenous?
  - In this sense, specifying the theoretical mechanisms ("the details...") matter
- *The regressions should take the cohort structure seriously*
  - Whose life-expectancy, child-mortality, education, etc. should we be measuring?
  - Regressions often use population averages – these are not the correct variables according to the theory

Main Comments/Questions

- *There is no capital or endogenous interest rate in model*
  - Makes it harder to link theory/predictions to some of the main features of the secular stagnation debate and differentiate across predictions
- *There are no interactions across countries*
  - Global capital markets are a weak link in the secular stagnation debate
  - Why don't savings go elsewhere if the interest rate is low?
  - This paper argues that LDC are going through delayed stages of same demographic dynamics
  - But no interaction across countries in potentially integrated markets (capital, goods, technology, labor)
  - Question: how would the dynamics be affected by a lower world interest rate?

The Model

- Model not spelled out in paper
- In order to justify regression specification, the model matters

Main building blocks:

- Individuals obtain utility from consumption and surviving children-quality.
  - SOE with perfect consumption smoothing
- Given technological environment (productivity, infant mortality, adult life-expectancy) and own ability, each individual decides:
  - whether to become skilled (requires a fixed time cost) or unskilled
  - how many children to have = quantity
  - how much time to spend with each child = quality
- Model has many moving parts. Endogenously evolving, non-optimally chosen, technologies (5):
  - infant mortality
  - adult life-expectancy
  - the skill bias of prod technology
  - productivity of production technology and also, by assumption, of child quality technology

Key Modeling Assumptions:

- There is a quality-quantity tradeoff in children
  - Child quality is a function of parental time and growth rate of TFP of production tech.
  - A higher grow rate of TFP produces greater child quality from the same time input
- The amount of human capital embodied in an individual depends on ability and whether skilled
- Adult life expectancy is $\uparrow$ in the fraction of skilled individuals in own generation
- Infant mortality is $\downarrow$ in per capita income and in the fraction of skilled individuals, both in previous gntn
- The growth rate of TFP is an $\uparrow$ function of fraction of skilled individuals in previous generation
- The relative productivity of skilled individuals in production is an $\uparrow$ fn of prop. skilled individuals in previous generation
- There is an exogenous retirement age R

Basic theoretical results:

- skilled individuals have fewer children
- fertility first increases w life expectancy T, but once sufficiently high ($T > R$) it decreases with T
- as T increases, average fertility falls more as share of skilled individuals $\uparrow$
- fertility also decreases with time spent on children, which depends on growth rate of productivity
- an economy with relatively low productivity of skilled individuals at first slowly sees improvements in infant mortality, life expectancy, human capital, and productivity.
- economy converges to a balanced growth path with long life expectancy, very low child mortality, and almost everyone skilled

Empirical Results

- The sample:
  - 131 countries grouped into (i) early vs late or (ii) pre vs post transition
  - observations are 5-year averages, 1950-2010
  - would be useful to understand *criteria* for the groups and shown membership of countries
- Change in education and life expectancy
  - overall concave relationship: interpretation?
  - education is average of all individuals 25 and over: mixes demographic structure and HC acquisition
  - should distinguish, as in the theory, between infant/child mortality and life expectancy conditional on making it to some age (e.g. 10)
- ln y and education
  - correlation depends on whether country is post vs pre or early vs late
  - but not clear what these categories are nor why there are now controls for capital per capita
  - coefficient on linear term is negative for the pre transition (or late countries)...why?

- Life expectancy $\longrightarrow$ Old age dependency ratio $\longrightarrow$ Savings
  - correlation between life expectancy and dependency ratio negative linear and positive sq term for all countries
  - interpretation: when life expectancy is low, it increases working population. when life expectancy high, it increases percent old.
  - effect on share of gross capital formation: none for late countries, negative for early countries
  - need to specify a model in which savings matter: ratio of young to middle age is probably more relevant
- Life expectancy and total factor productivity
  - no correlation between the two for early countries
  - negatative linear and positive sq term for late countries.
  - no controls for gdp or capital per capita.
- Old age dependency ratio and TFP
  - positive for all. Good news!
  - how to interpret? Why should we look at this?