GTSP

Global Energy Technology Strategy Program

Overview: A Point of Departure Scenario

GTSP Technical Briefing

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Outline

- Point of departure (?!)
- Population
- Labor force
- Labor Productivity
- Economic Growth

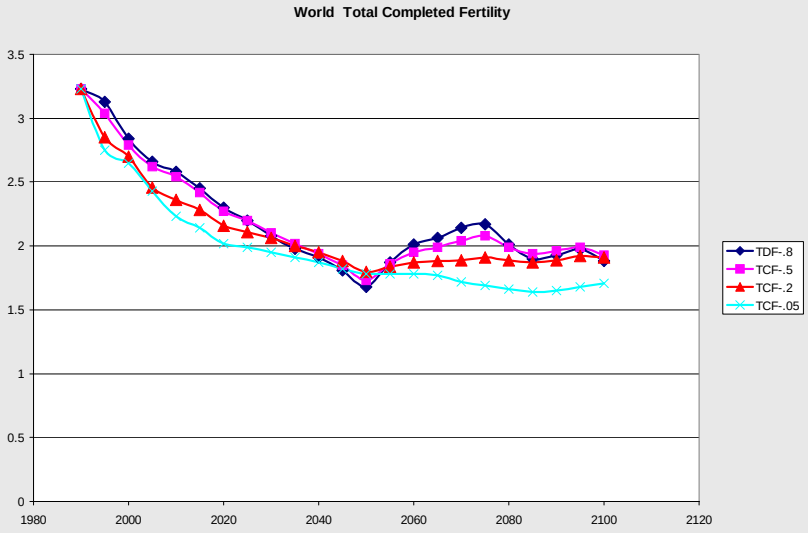
Point of Departure is a departure

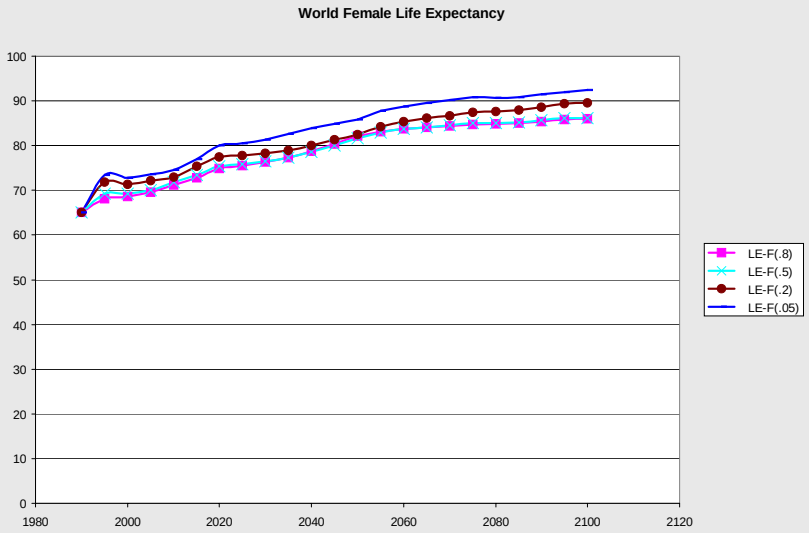
- Point of departure reorganizes the logic of the scenario process from logically equivalent cases as in SRES to a logical tree.
- One still asks ‘what if’, but the structure of the ‘what ifs’ is off of the initial scenario, not abstract.
- This allows one to focus on the logic of the initial or point of departure scenario.
- This presentation is about the logic of the point of departure through GDP.

Population Derivation

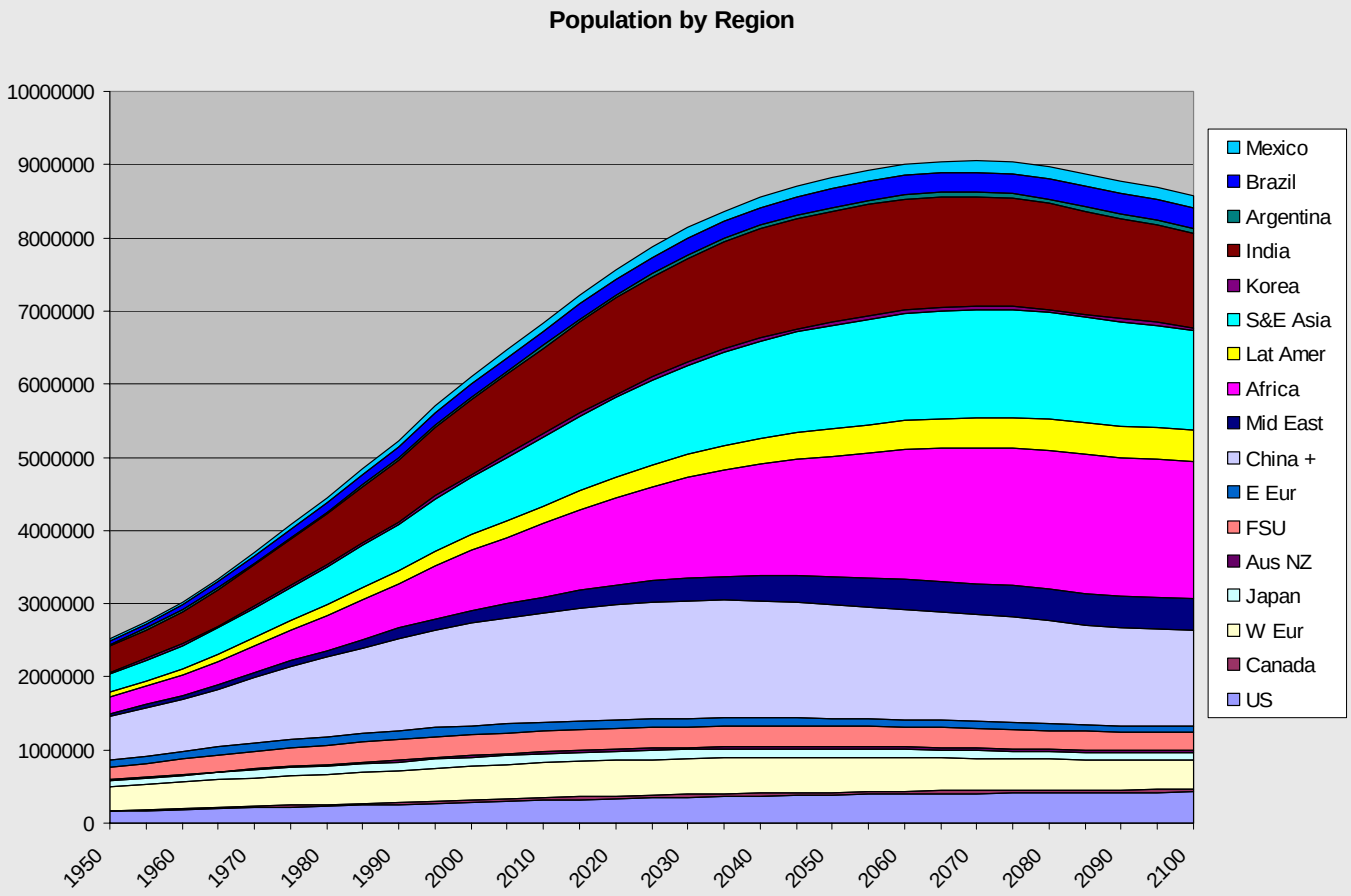
- Chose IIASA Techno-Garden trajectory
  - Moderate decline post 2050 to reflect increasing opportunity cost of children
  - Continue current trends in Life Expectancy
- Developed MiniCAM regions from downscaled country level data provided by Brian O'Neill.
- Used inverse calculation to develop age specific populations needed for Labor Force calculations
  - Assumed asymptotic value of TCF of 1.85.
  - Resulting regtional life expectancies range from ~50 to ~100
- Implication is the population numbers need more work

The inverse calculation can test the consistency of total population, life expectancy and fertility assumptions

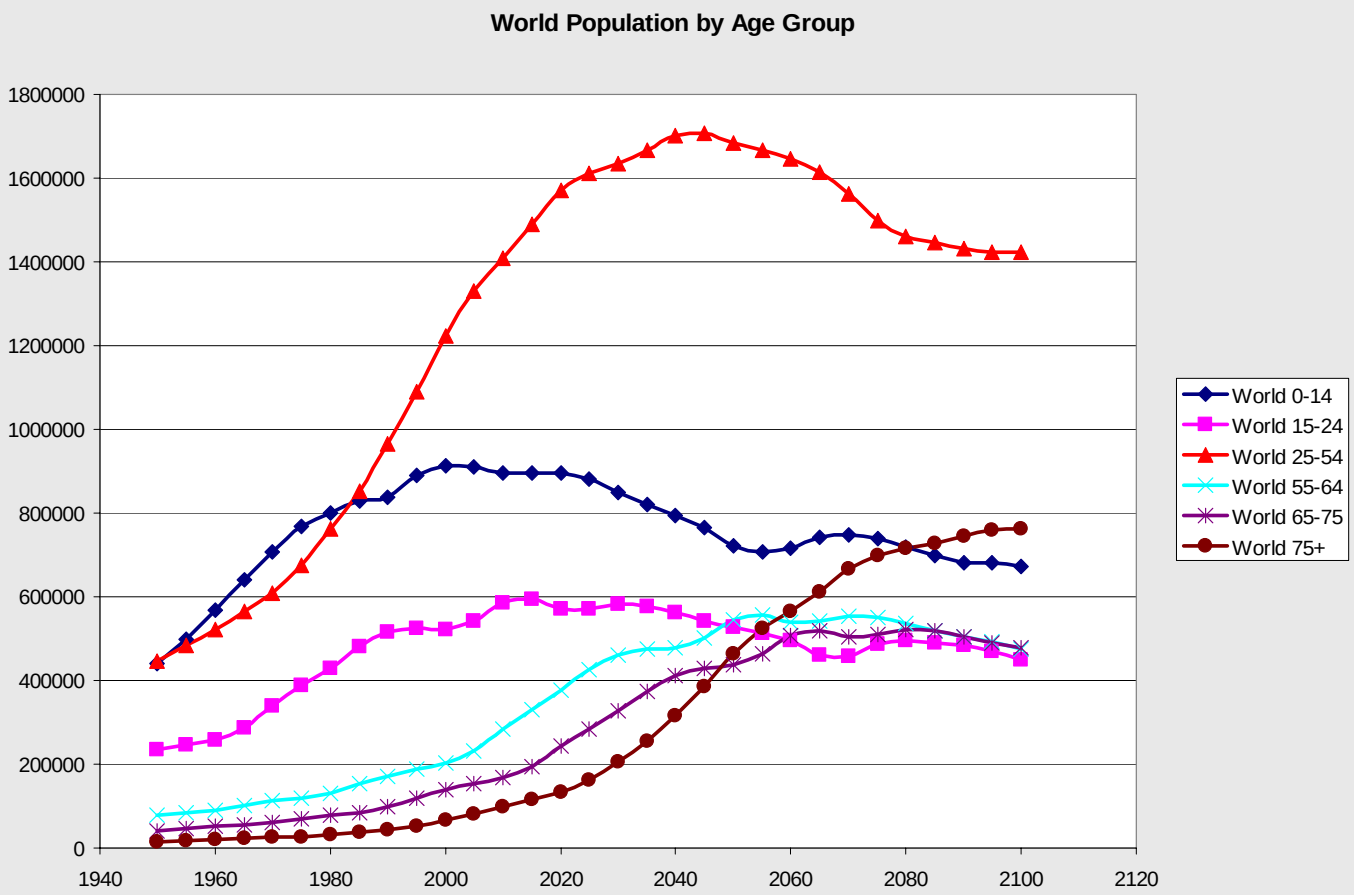




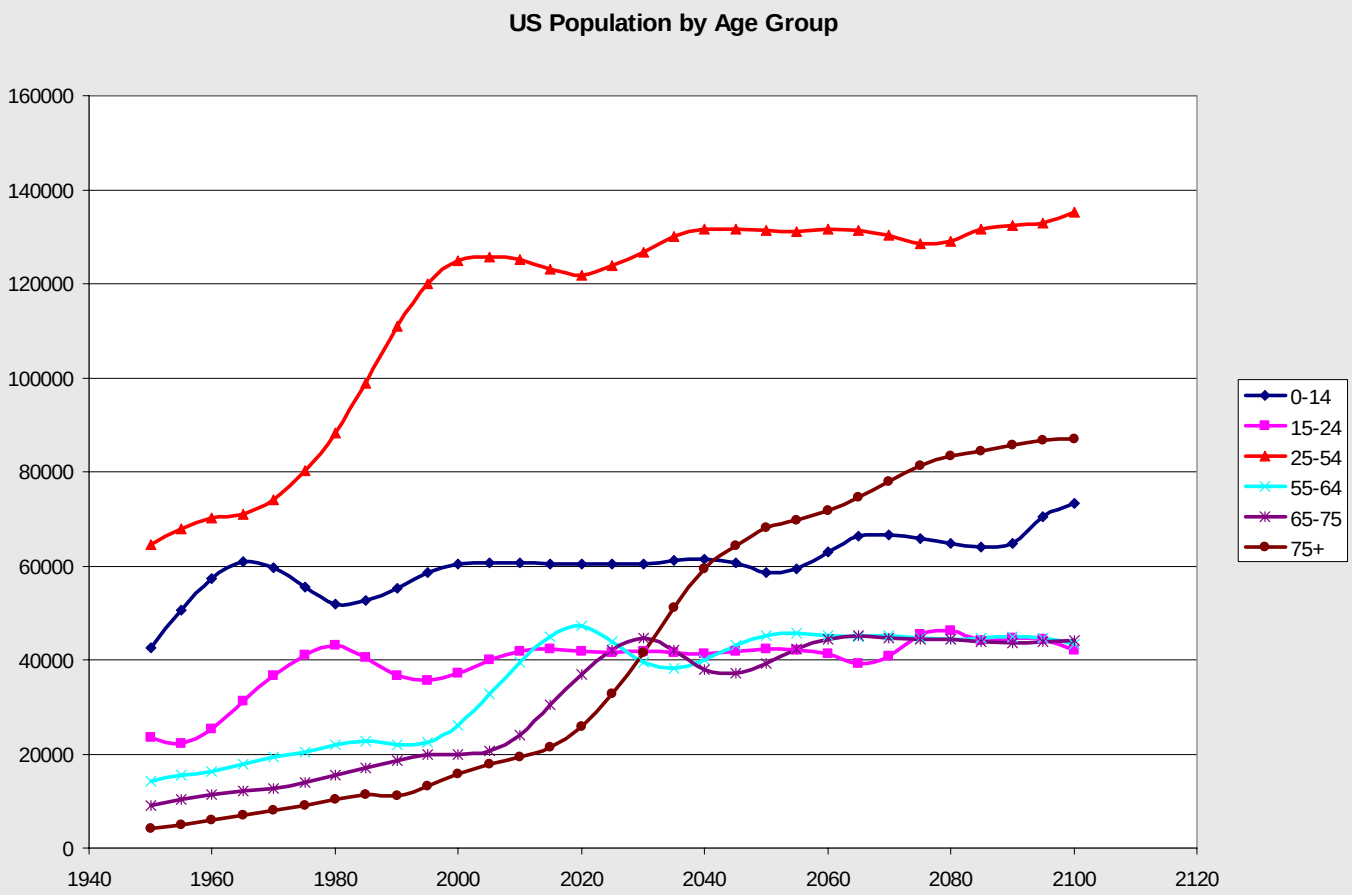
Population peaks in 2050 and then declines



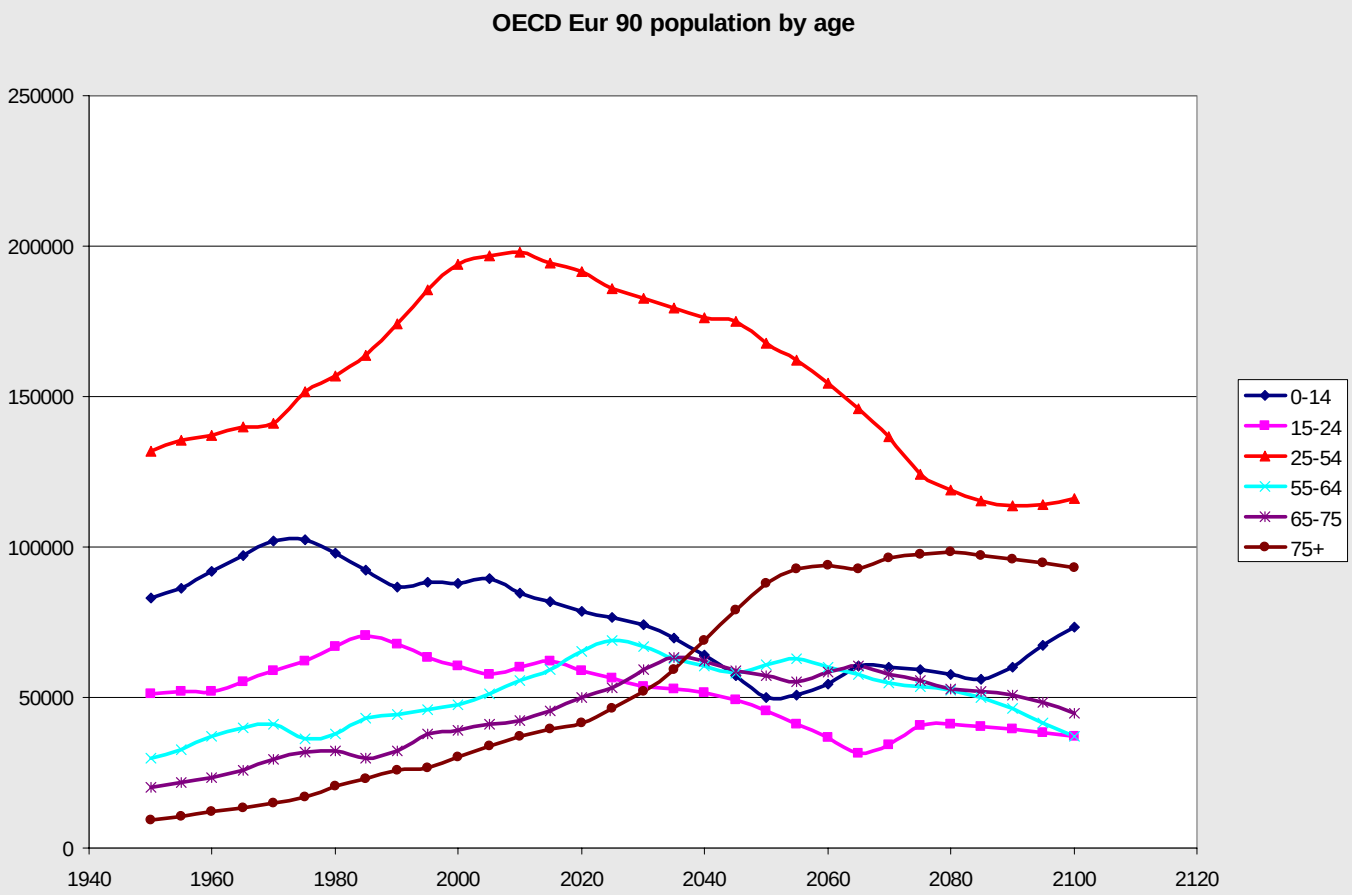
Global population fractions become stable only after 2075



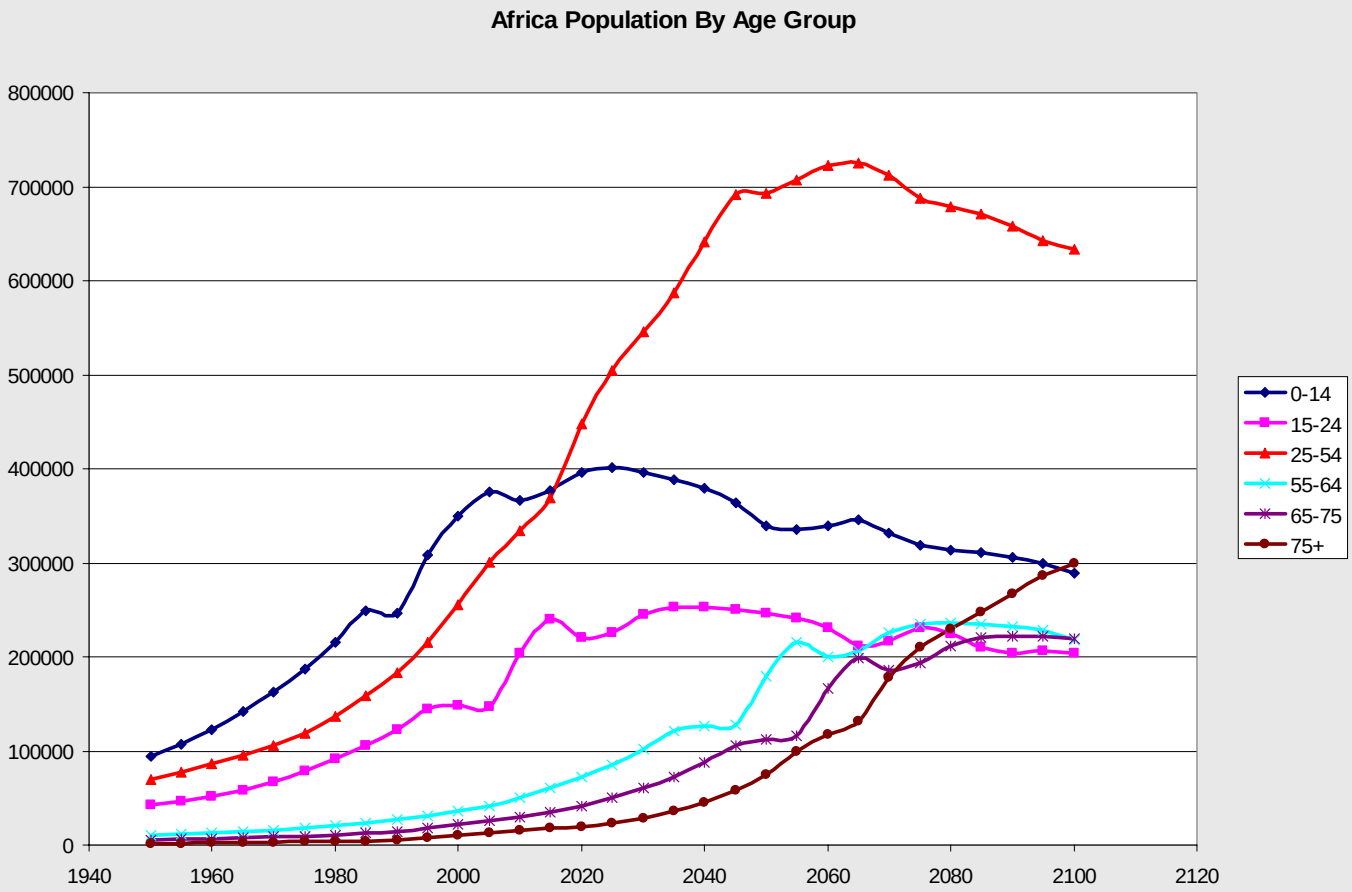
US population fractions are stable except for the over 75 group



OECD Europe will have prime working age group peak around 2010



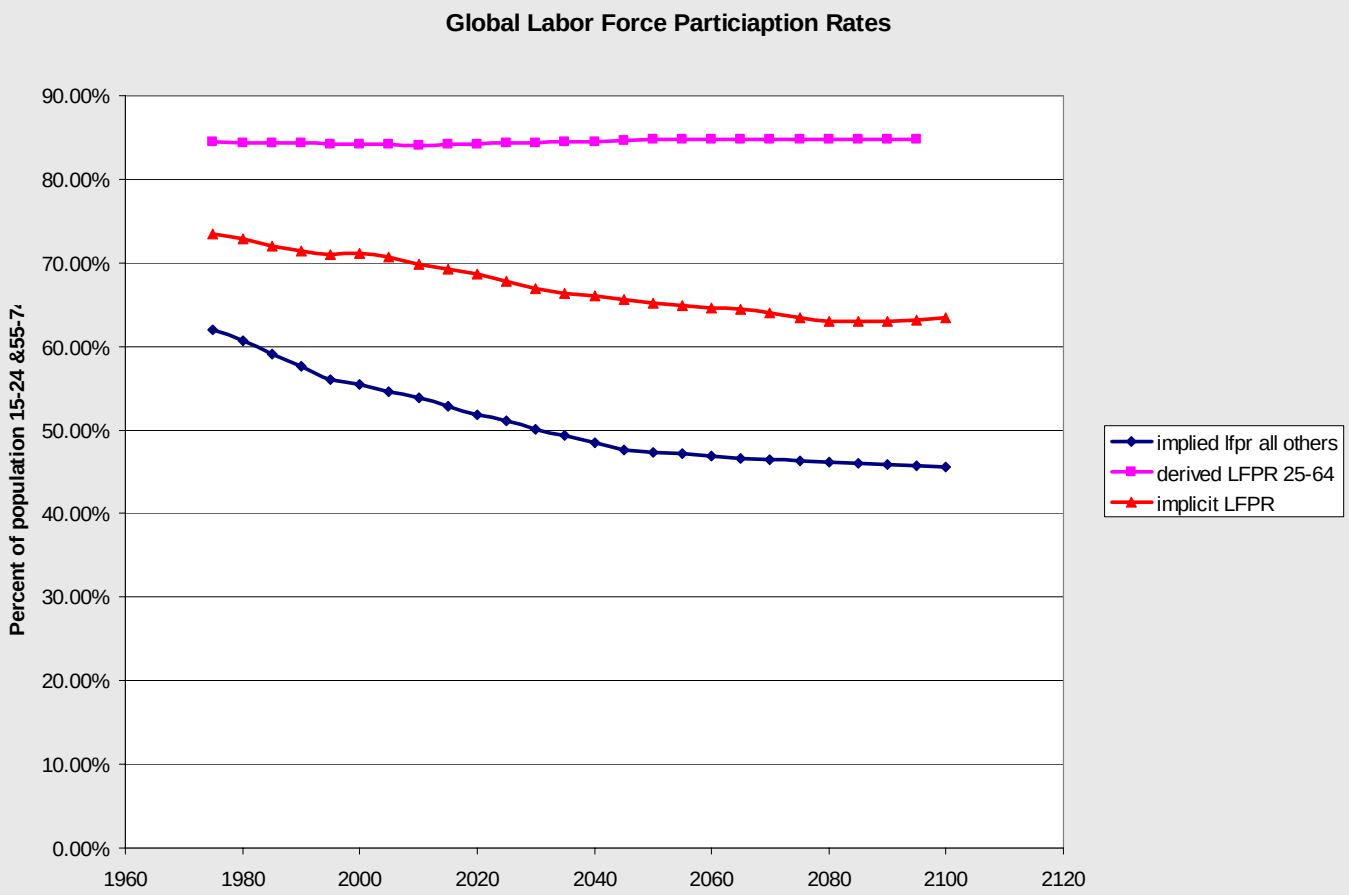
African population stablizes only post 2050



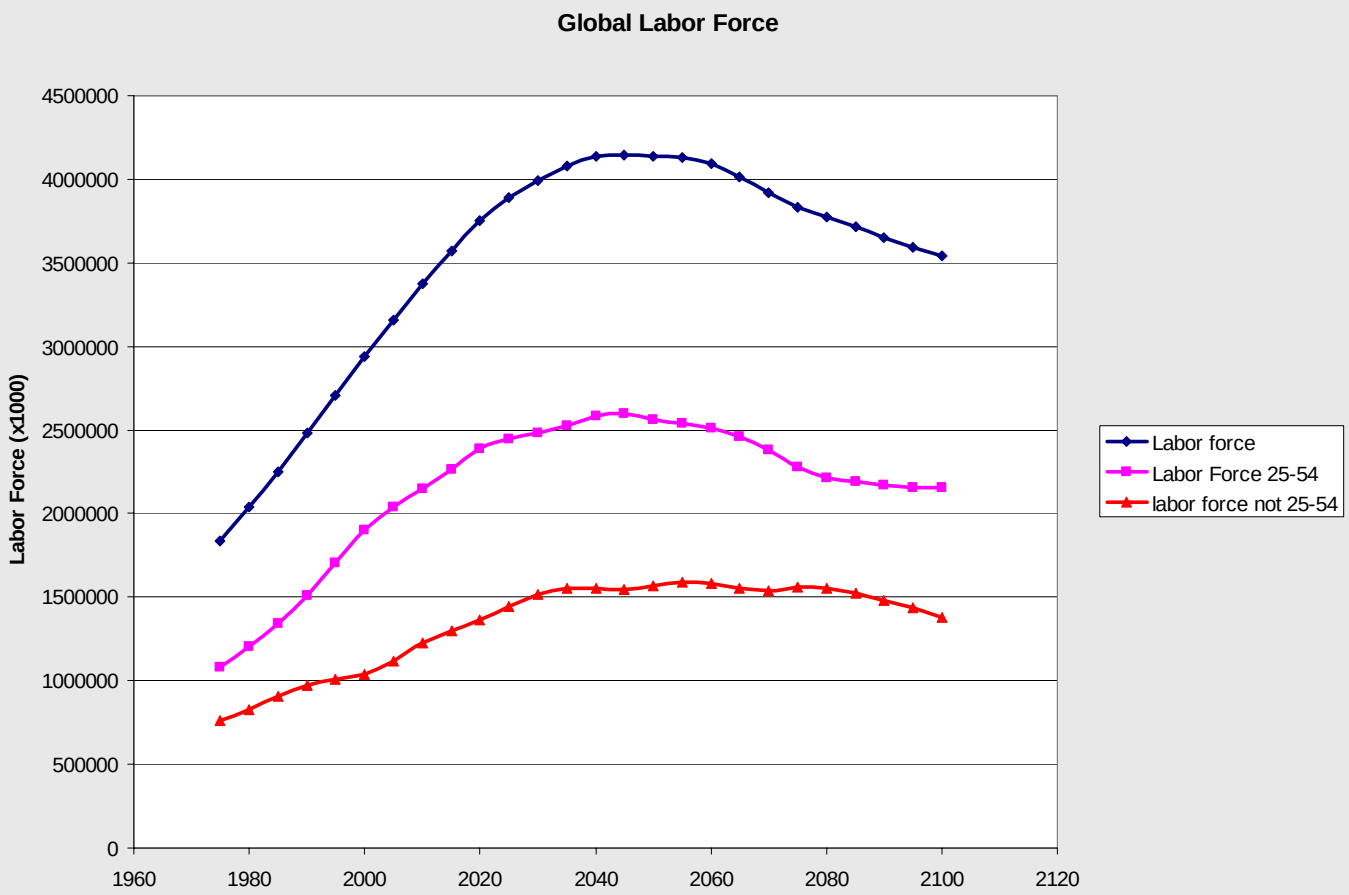
Labor Force Assumptions

- Prime Age (25-54) Males stay at around 90% and females approach 80%
- Youth (15-24) stay at around 66% and those over 55 gradually increase labor force participation.
- Labor force participation ceases at age 75.
- (In the US, education is the key determinant of labor force participation after age 55.)

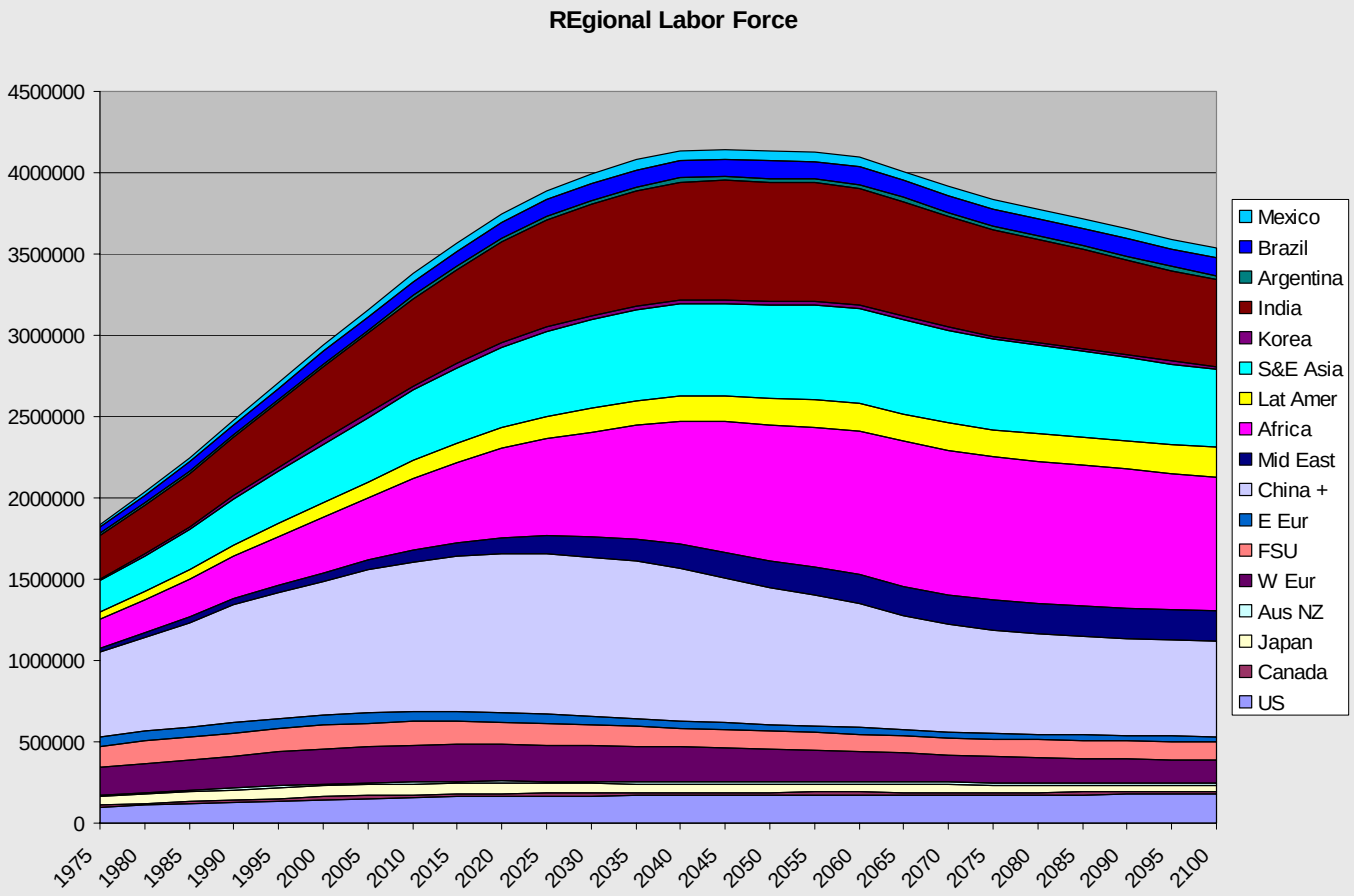
Total Labor force participation declines as populations age and a larger fraction of the youth attend school



Total Labor force peaks about 2050



Asia and Africa will dominate the global labor force in the 21st Century



Labor Productivity

- Intuition suggests that labor productivity should rise more rapidly in developing economies, both because there is transfer of labor from low productivity to higher productivity activities and because productivity is typically not at the frontier in any industry.
- The empirical record is very mixed.
- There is some support for a two percent per year reduction in the gap.
- Measurement issues abound.

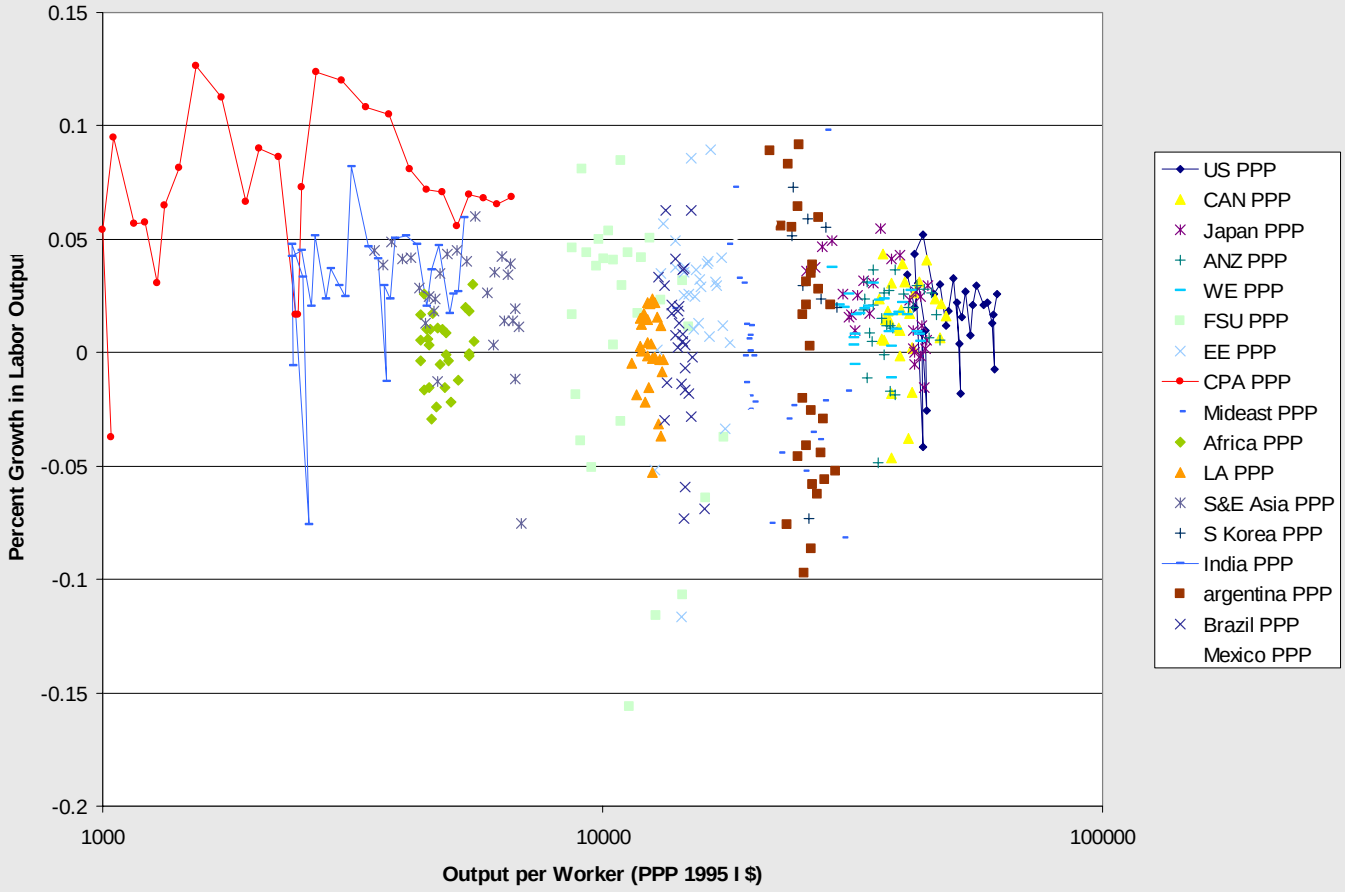
An Aside on PPP/LCU

- In a developing economy, properly measured PPP growth rates will be less than properly measured LCU growth rates.
- Properly measured means some form of superlative index (eg.Fisher or Tornquist)
- Rationale: Superlative indices involve prices and quantities from both initial and final period (typically chained).
- In a developing economy labor prices rise so labor intensive quantities are substituted away from.

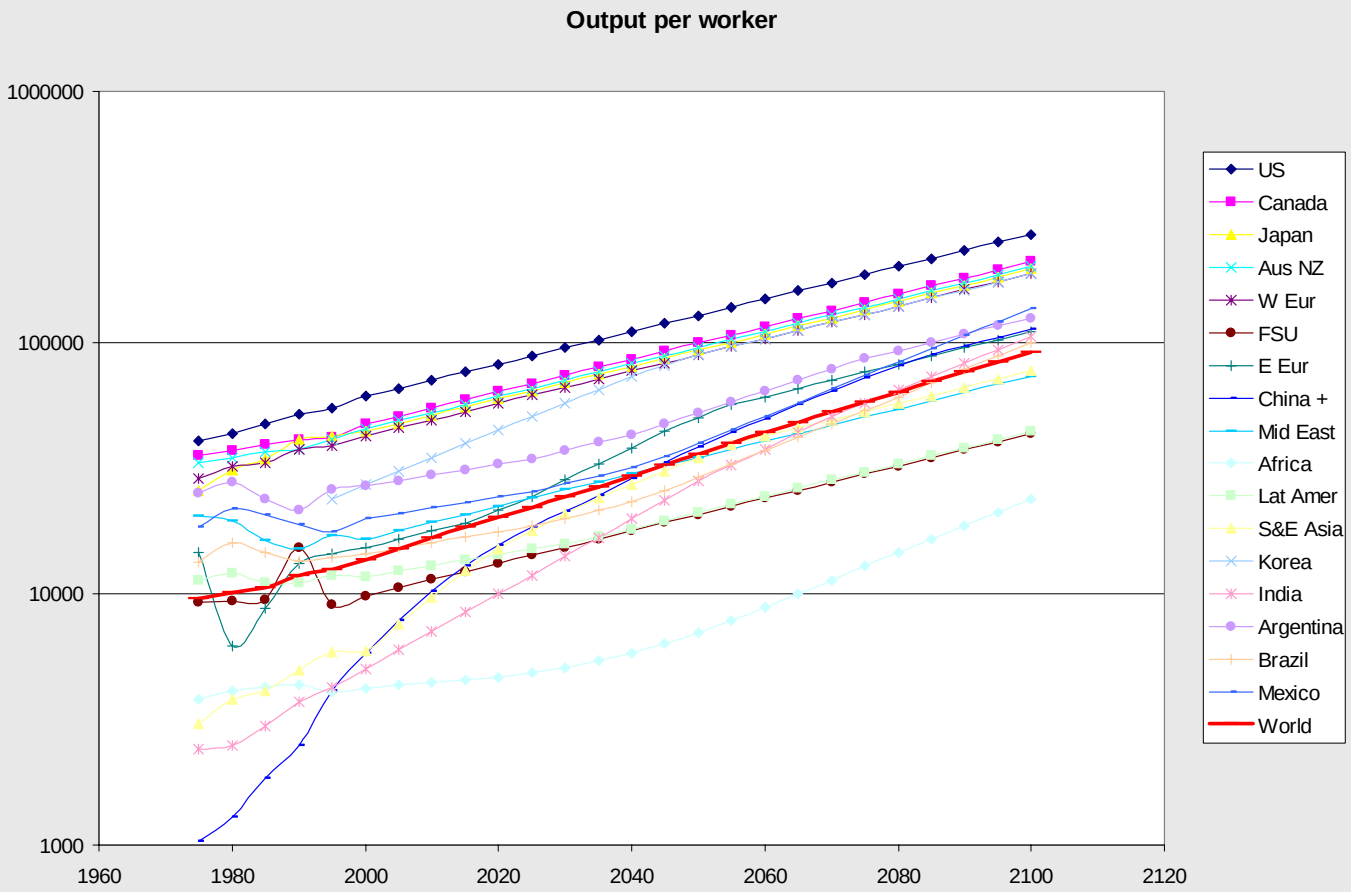
Aside-II

- An LCU superlative index will reflect both the rising price and the falling quantity.
- A ppp index will reflect the falling quantity, but since prices are much more stable, not the rising price. (PPP prices are either US or an international average). Hence PPP growth rates should be lower.
- Normal practice is to apply LCU growth rates to PPP values for one period. => Empirical values for PPP growth rates are too high.

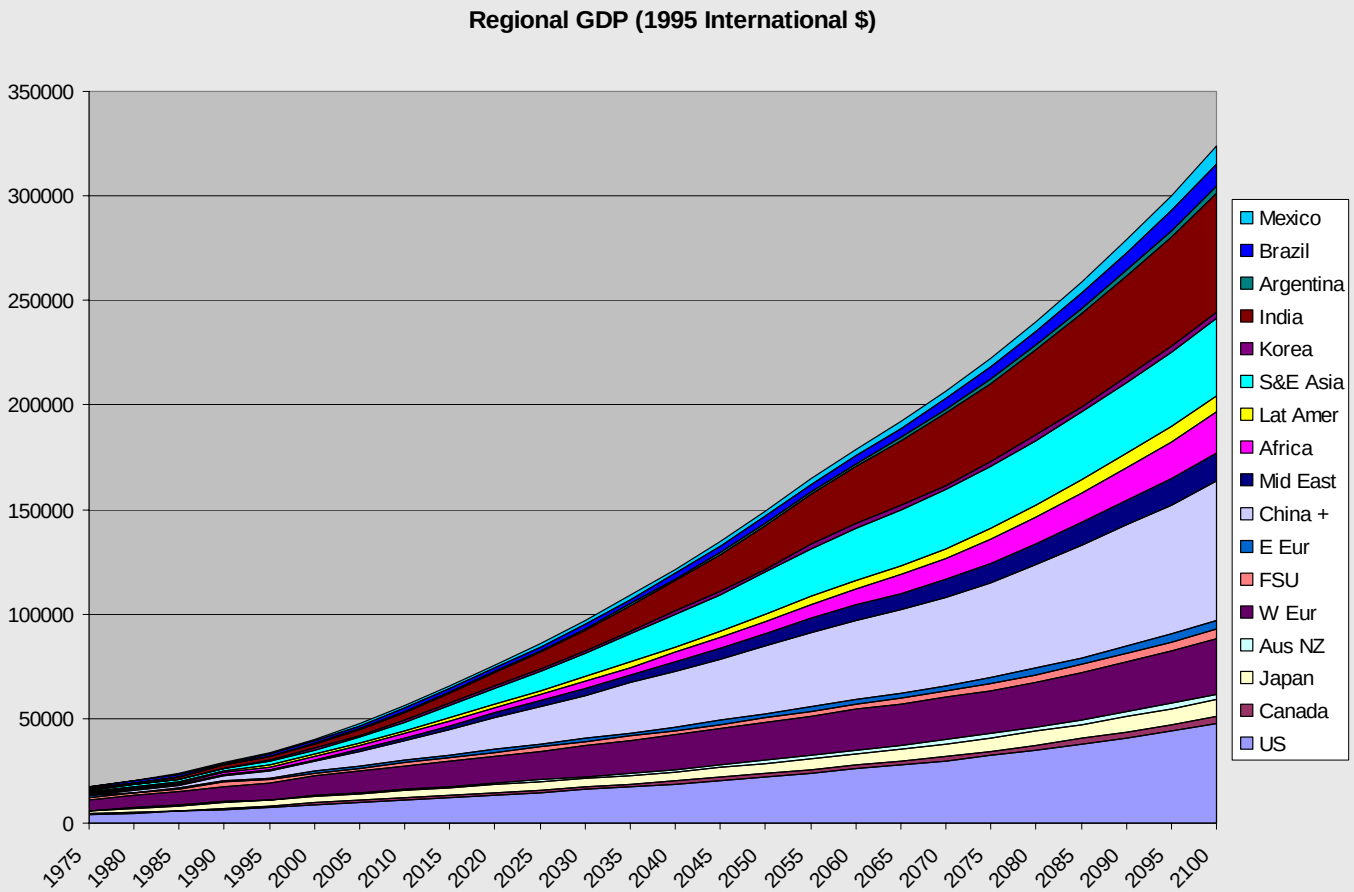
Economies which grow rapidly avoid negative events



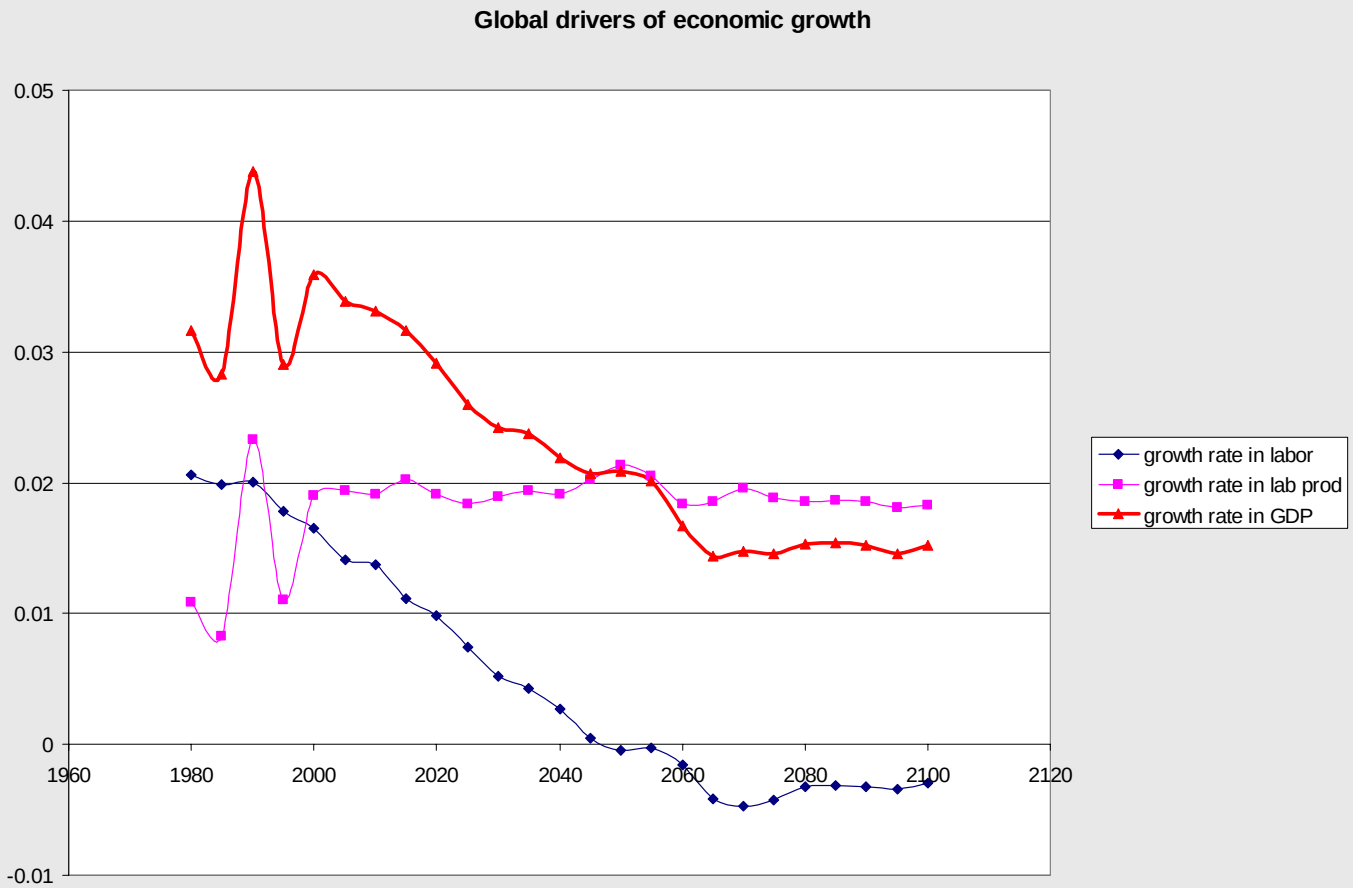
Regional Growth Rates for La



Global Economic activity continues its rapid climb.



Growth rates decline—due to falling growth rates for the labor force.



Comparison to SRES

- If we correct from 1995 International dollars to 1990 US dollars, total output falls to 285 Trillion from 325 trillion. This is higher than B2 but less than B1
- In SRES, MiniCAM used an 80 % labor force participation rate but only included those 15 to 65 in the working age population. If we used the same rules here, output would rise to 330-340 Trillion 1990 US dollars.
- GDP for our Point of Departure is approximately the same as SRES B1.

Lesson Learned

- It is important to focus on structural aspects because simple extrapolation is apt to cause signficant errors.
- It is better to use underlying drivers, because outcomes may be the result of trends which won't continue.
- Adding education would really improve the structure underlying long term scenario growth rates.