

**The New Silver Age:  
How Population Aging Is Changing  
The United States, Asia and The World**

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**Maureen and Mike Mansfield Foundation Annual Conference**  
**University of Montana**  
**Missoula, MT**  
**September 23, 2009**

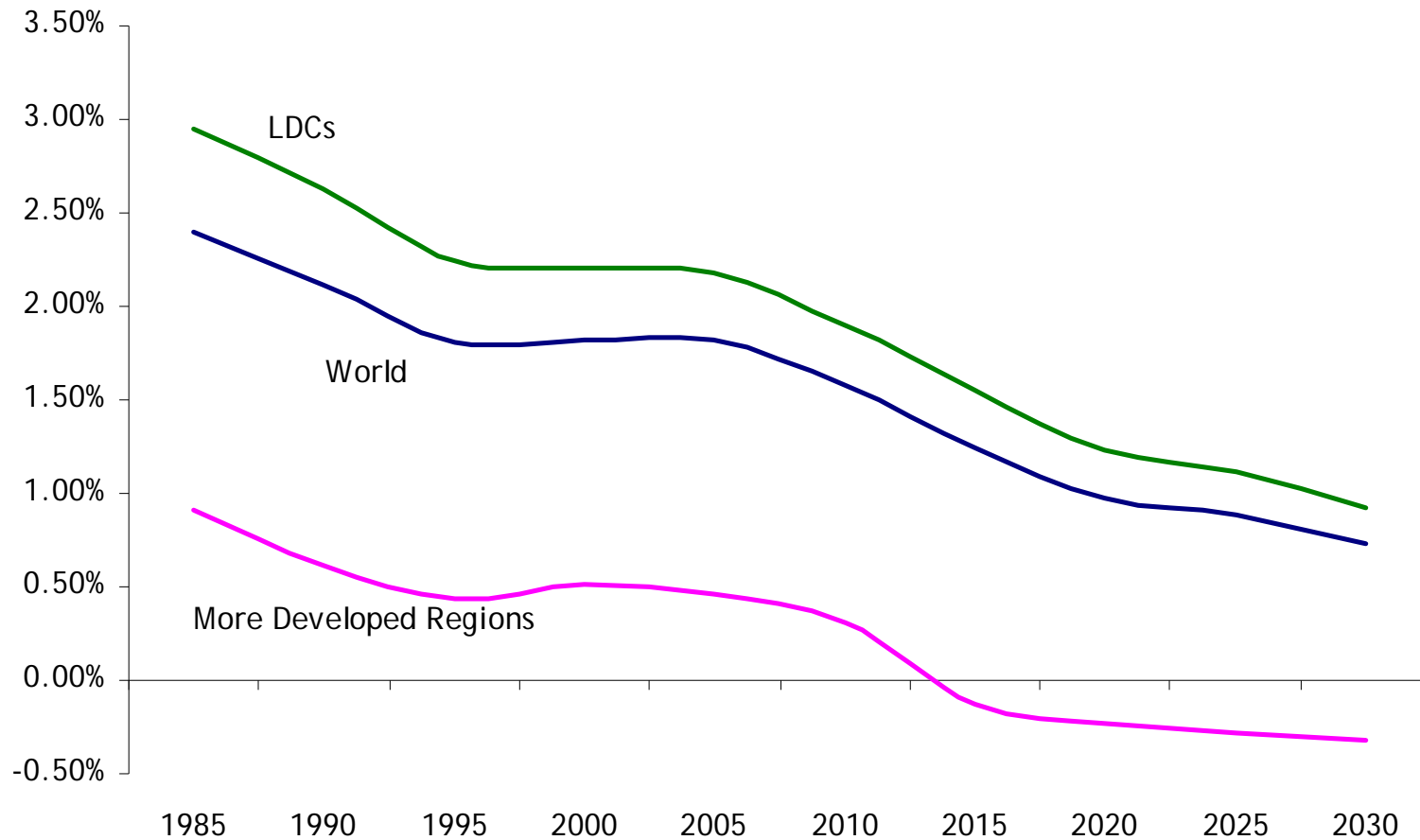
# Outline of presentation

- **World Overview---**  
**Demographic Outlook to 2030**

**with breakouts for:**

- **China**
- **Russia**
- **India**
- **Japan/Western Europe**
- **USA**

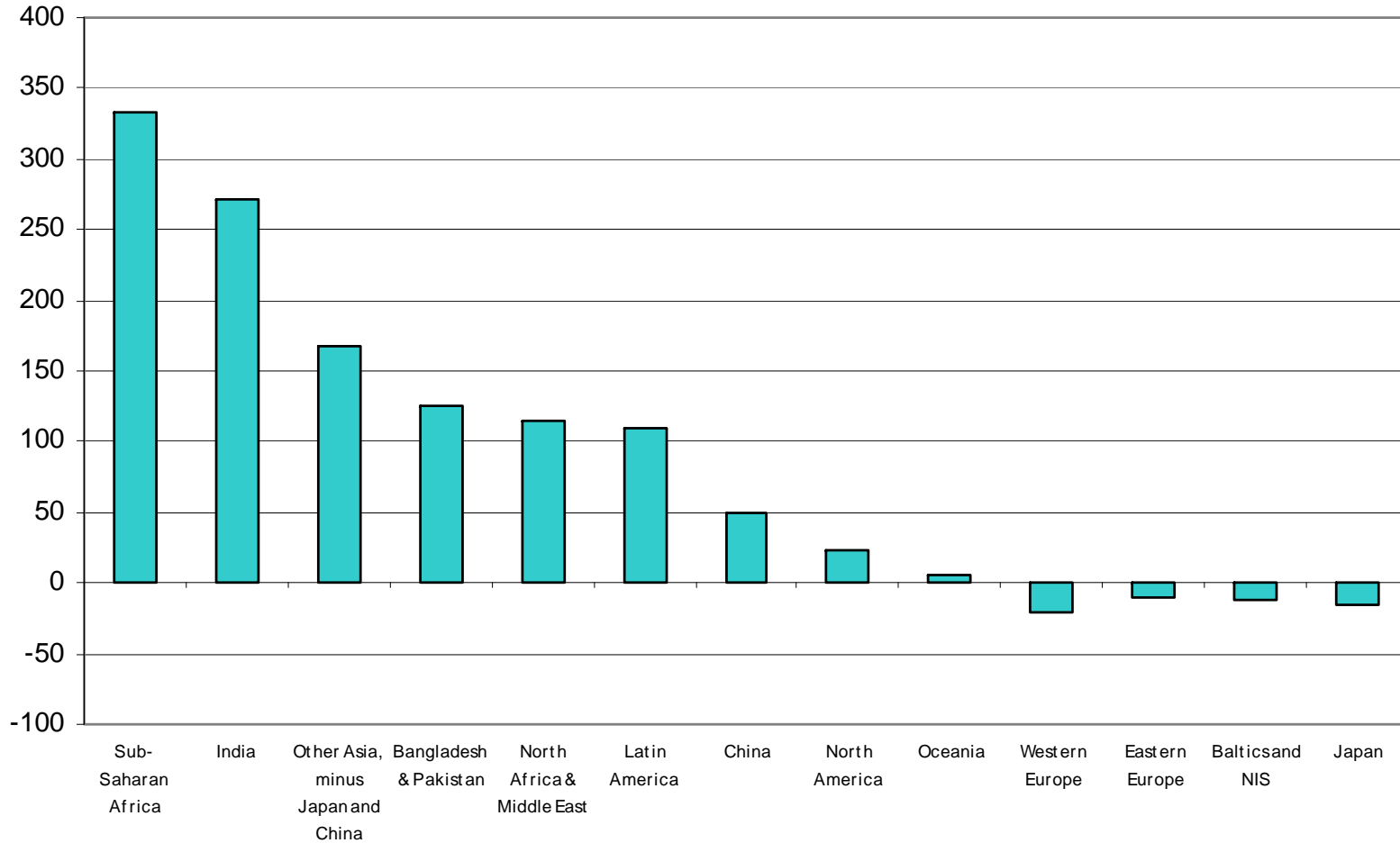
# Average Annual Rate of Growth of Working Age Populations, ages 15-64, 1980-2030



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, *World Population Prospects: The 2008 Revision and World Urbanization Prospects: The 2007 Revision*, <http://esa.un.org/unpp>, Monday, March 23, 2009; 3:52:24 PM.

# Total Projected Growth of Working Age Population (15-64) By Region or Country: 2005 – 2030 (millions)

World Total Change: 1,144 million

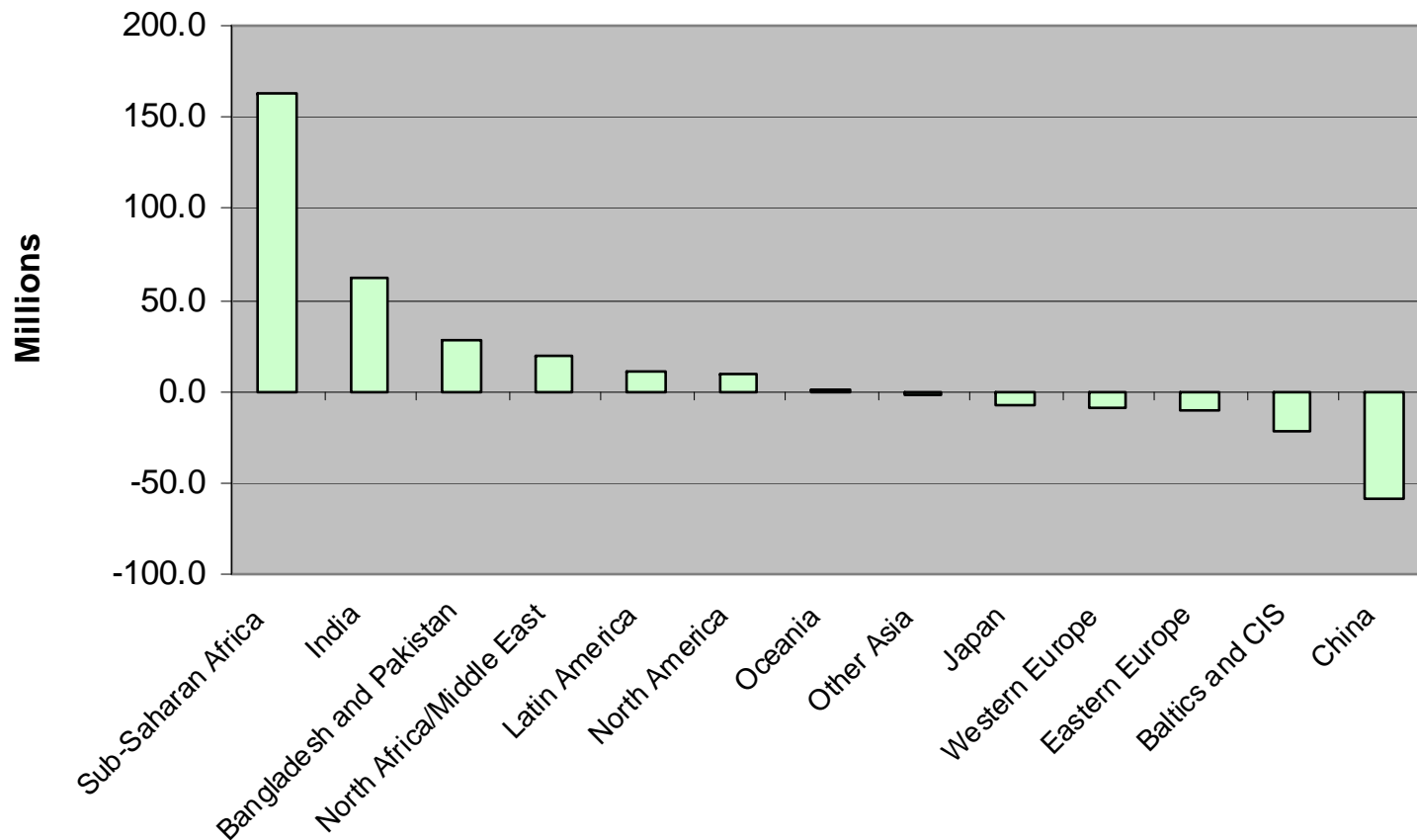


Source: U.S. Census International Database

Accessible online at <http://www.census.gov/ipc/www/idbagg.html>

# Total Projected Growth of Younger Working Ages (15-29): 2005-2030

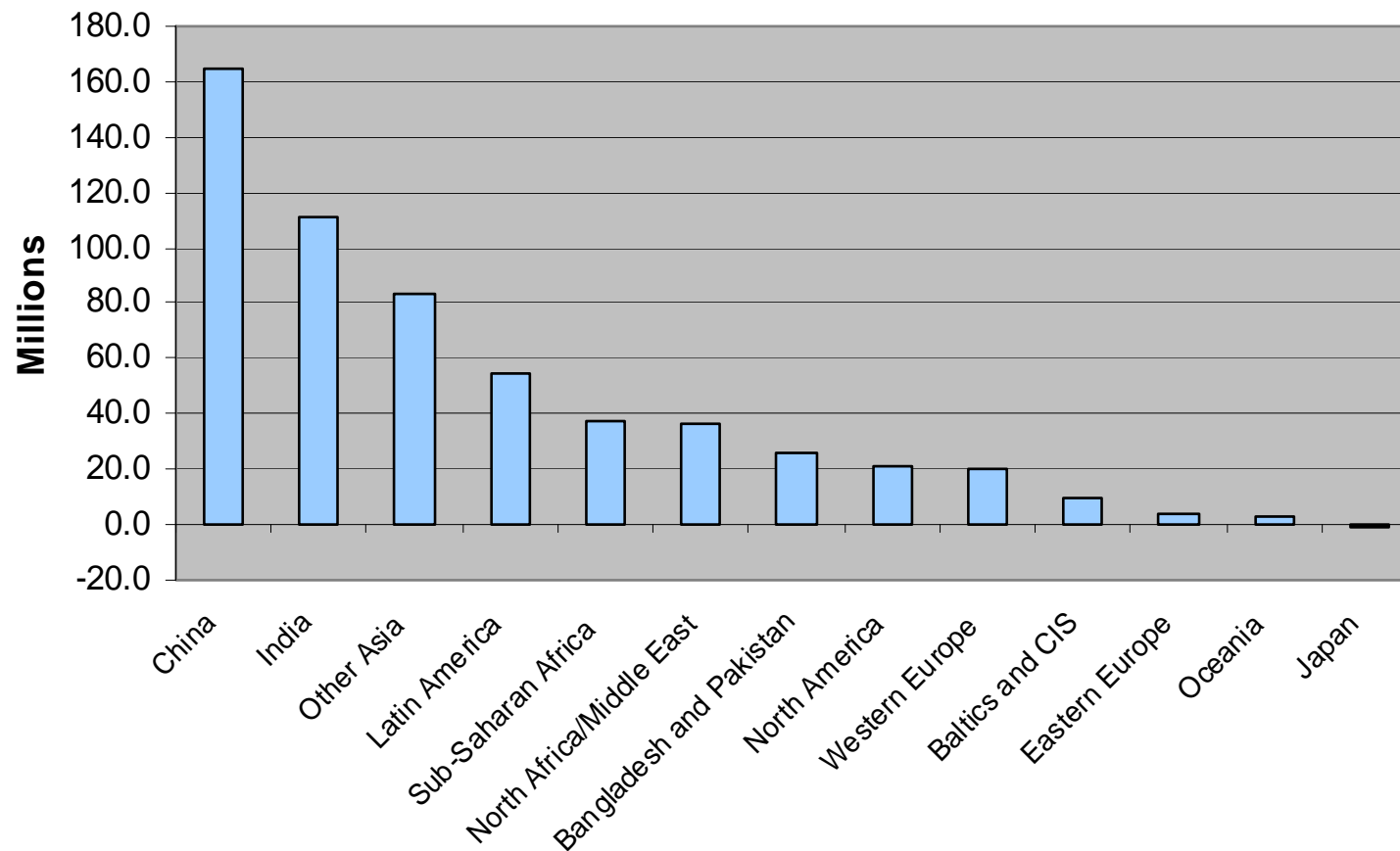
World Total Change: 186 million



Source: US Census Bureau International Database. Available online at <http://www.census.gov/ipc/www/idbnew.html>

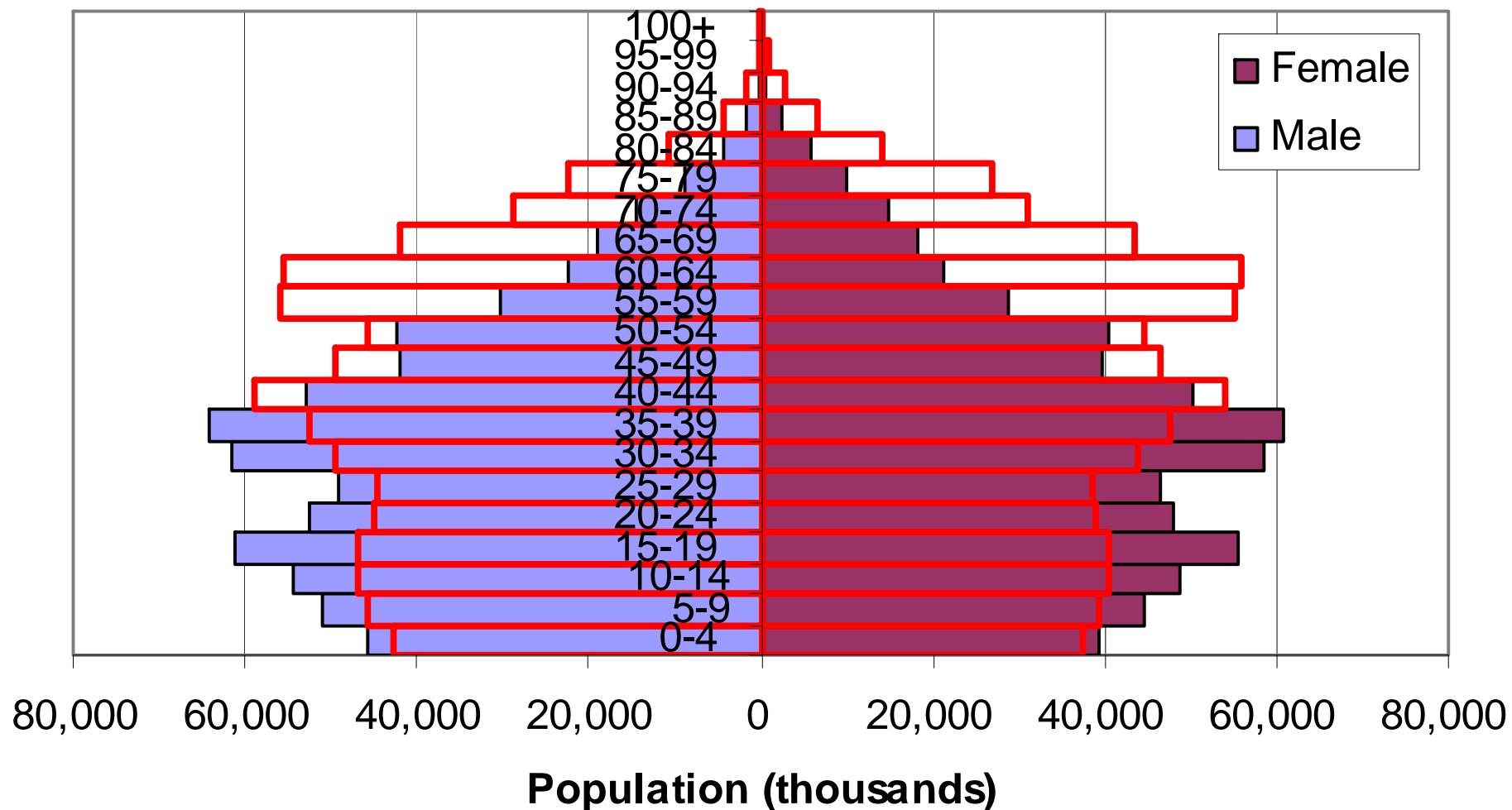
# Total Projected Growth of Older Working Ages (55-69): 2005-2030

World Total Change: 571 million



Source: US Census Bureau International Database. Available online at <http://www.census.gov/ipc/www/idbnew.html>

# Estimated and Projected Population Structure: China, 2005 vs. 2030

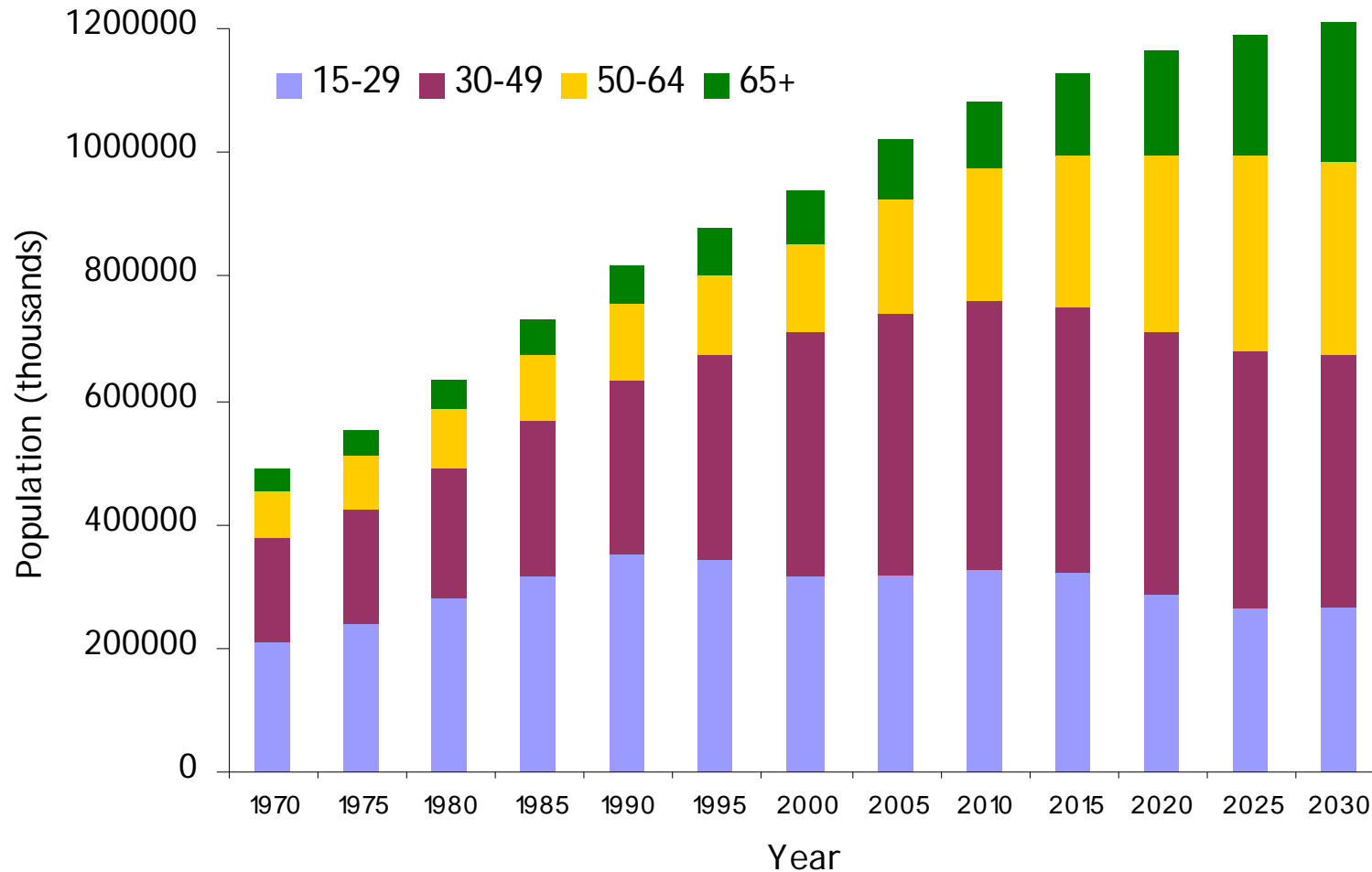


Note: "medium variant" projection

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2006 Revision, <http://esa.un.org/unpp>, Tuesday, December 4, 2007; 4:00 PM.

## No Repeat Performances..

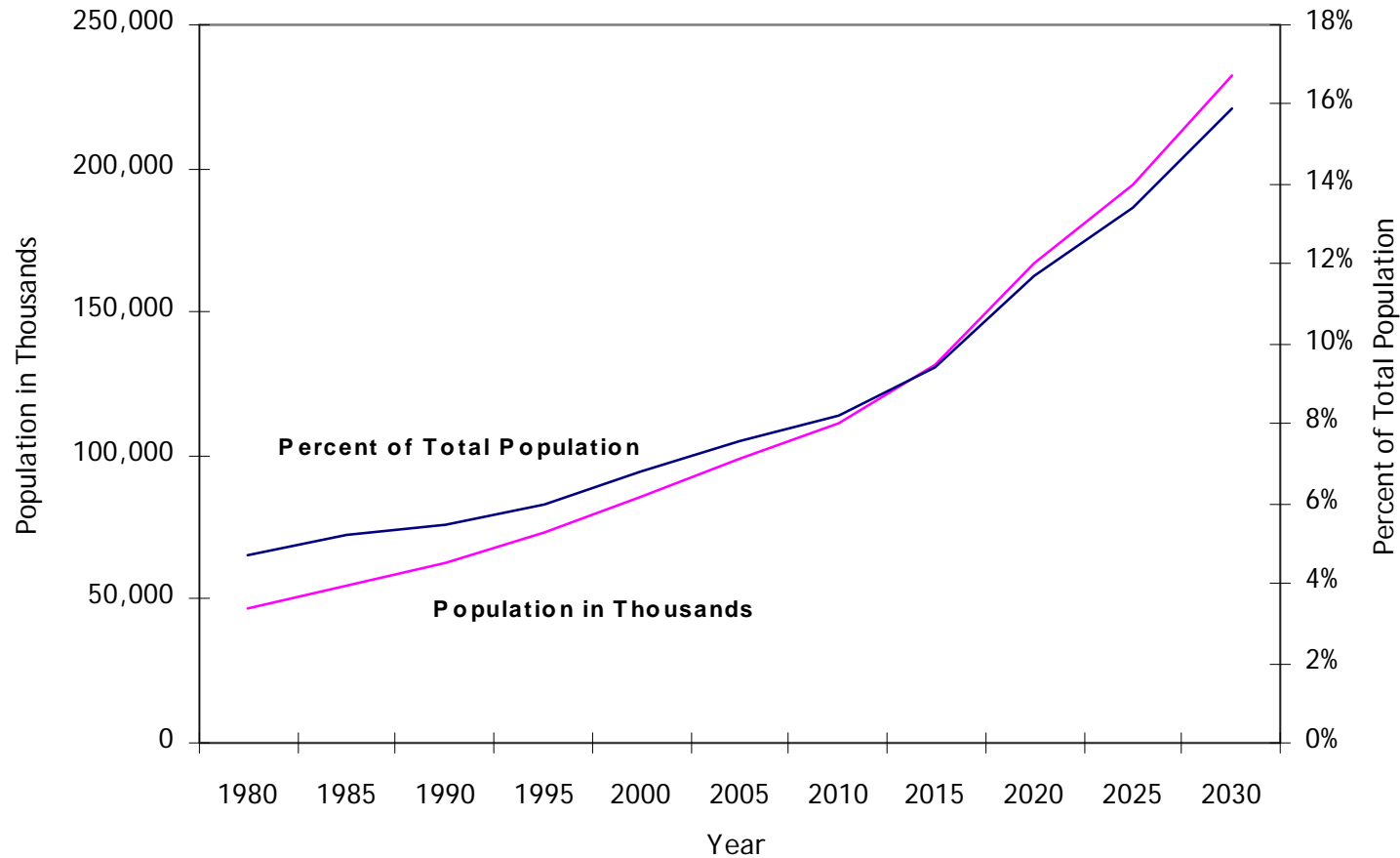
Adult Population 15+ by Age Group: China, 1970-2030 (estimated and projected, thousands)



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2008 Revision, <http://esa.un.org/unpp>, Wednesday, May 13, 2009; 2:12:34 PM. Note: "medium variant" projections

# Beijing Forgot About This Population Explosion...

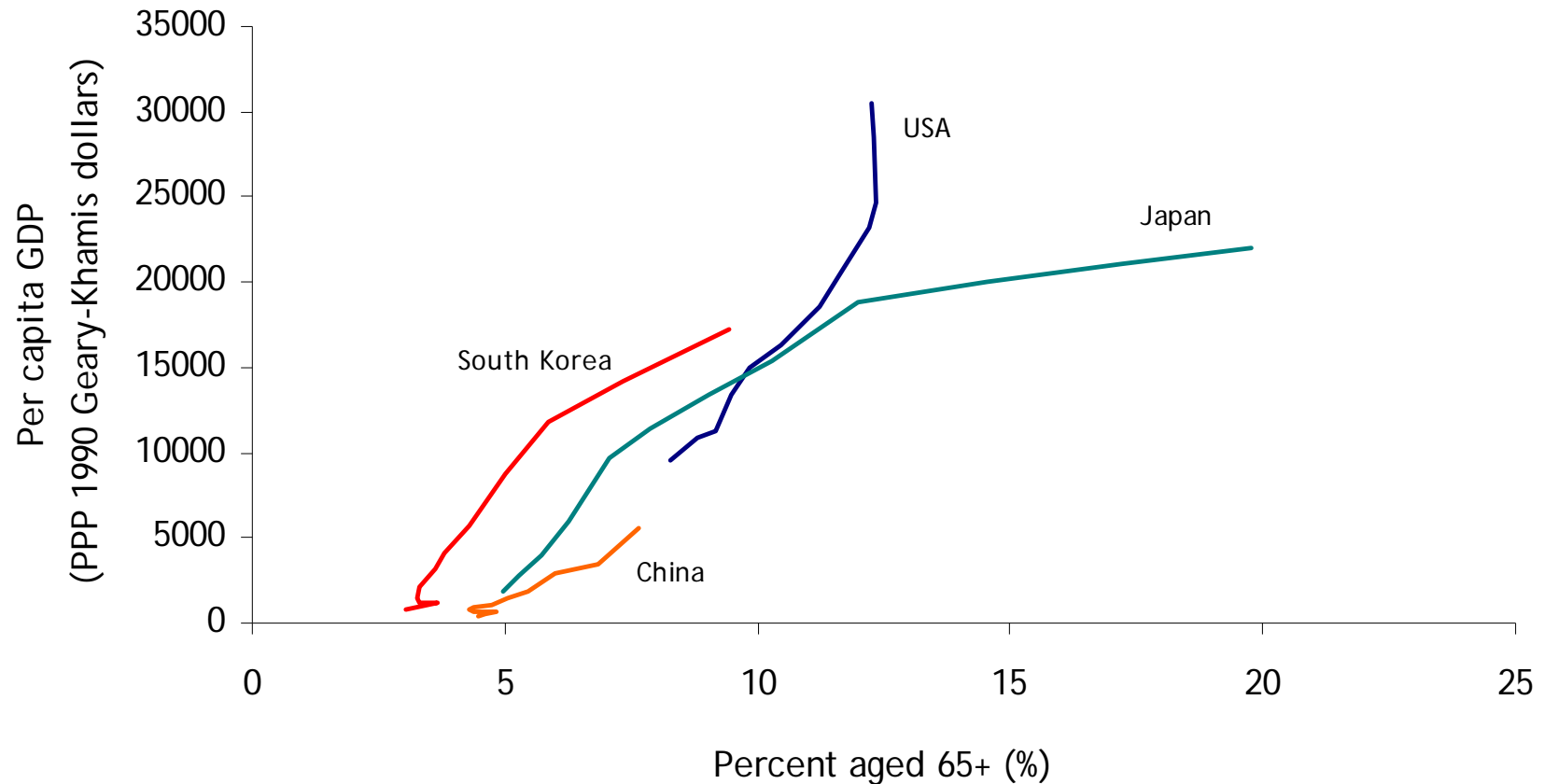
Estimated and Projected Population Aged 65+:China, 1980-2030



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2008 Revision, <http://esa.un.org/unpp>, Wednesday, May 13, 2009; 2:12:34 PM. Note: "medium variant" projections

# It's Better To Be Old And *Rich*...

Percent of population 65+ vs. Per capita GDP (PPP):  
China and Selected Other Countries, 1950-2005

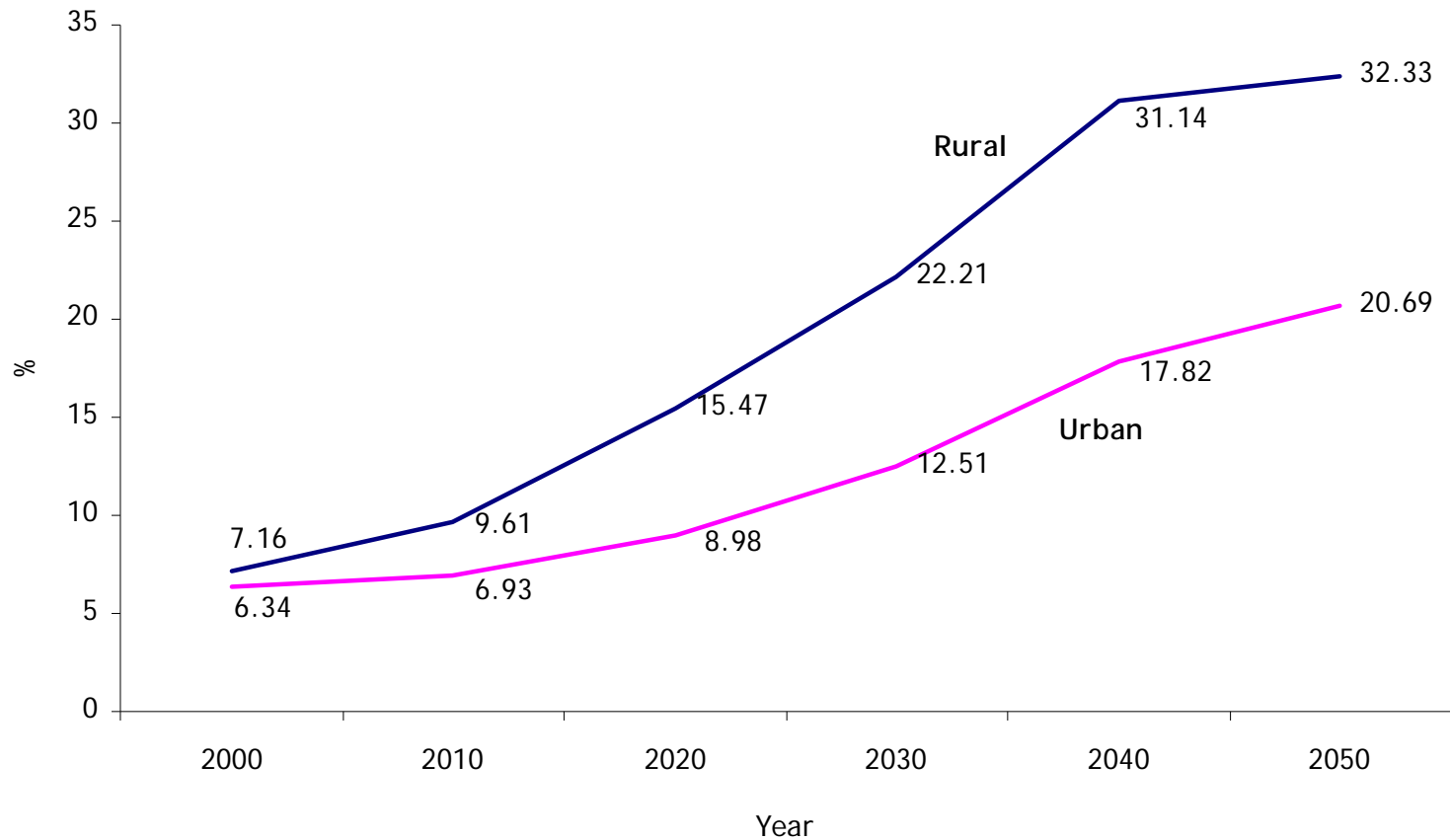


Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2006 Revision and World Urbanization Prospects: The 2005 Revision, <http://esa.un.org/unpp>, Monday, January 26, 2009; 3:31:49 PM; Angus Maddison, "Per Capita GDP PPP (in 1990 Geary-Khamis dollars)," *Historical Statistics for the World Economy: 1-2006 AD*, table 3, <http://www.ggdc.net/maddison/> (accessed January 27, 2009).

Taiwan Population: *Statistical Yearbook of the Republic of China (Taiwan)*, "Table 10. Age-specific distribution of population, dependency ratio, index of aging and median age", available at <http://eng.dqbas.gov.tw/lp.asp?CtNode=2351&CtUnit=1072&BaseDSD=36>.

# China's Retirement Villages

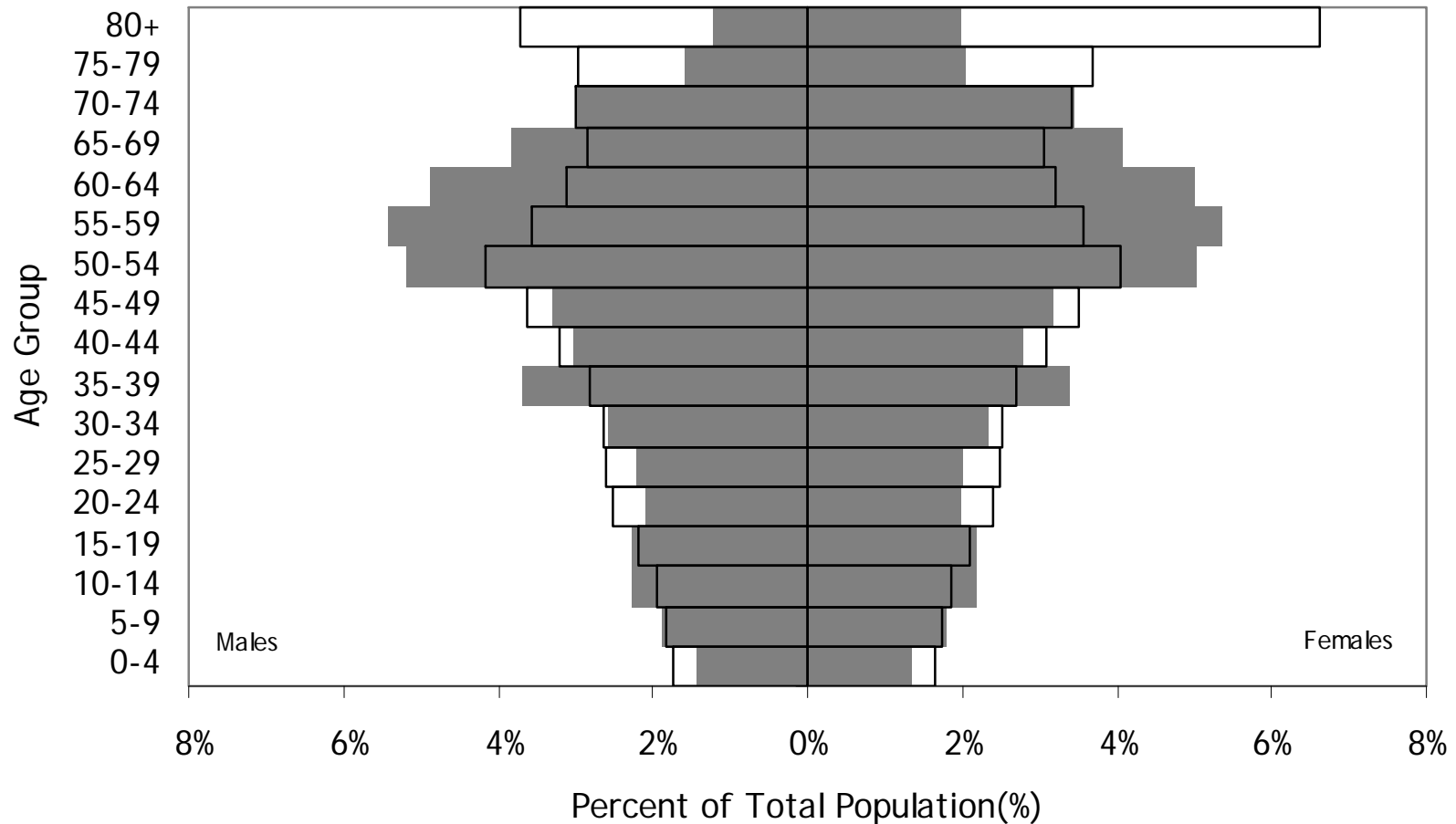
Elderly 65+ in China's rural and urban total population  
(%, projected, medium fertility and mortality)



Source: Zeng Yi, Zhenglian Wang, Jiang Leiwen, and Danan Gu, "Projection of Family Households and Elderly Living Arrangement in the Context of Rapid Population Aging in China," *GENUS* (2008).

# The Provinces Don't Look So Great, Either

Projected Population Structure, 2025:  
Japan (shaded) vs. Heilongjiang Province, China



Source: U.S. Census Bureau, International Data Base, <http://www.census.gov/cgi-bin/ipc/idbagg> (accessed July 31, 2008), And U.S. Census Bureau, International Programs Center, unpublished projections.

# Quick, What Makes US Social Security Look Like Fort Knox?

Coverage and Actuarial Balances of Current Public Pension System:  
USA, Japan, China (percent)

	Coverage	Net Present Value Unfunded /GDP
USA 2008	88 <sup>1</sup>	38
Japan 2001	c. 100 <sup>2</sup>	60-70 <sup>3</sup>
China 2003	c.16	125-150

Notes: 1. Proportion of fully insured persons 20+ in OASDI, 2008. 2. Mandatory participation of persons 20+ in basic plan. 3. Estimates for burden post-2000 round of reforms.

Sources: China: Loraine A. West and Daniel Goodkind, "Population Aging and Social Safety Nets in China: Factors and Trends Affecting Policy Trade-Offs." U.S. Census Bureau, International Programs Center, April 2003 (unpublished paper); Japan: Hamid Faruqee and Martin Muehleiser, "Population Aging in Japan: Demographic and Fiscal Sustainability," IMF Working Paper WP/01/40, April 2001, <http://www.imf.org/external/pubs/ft/wp/2001/wp0140.pdf> USA: Derived from U.S. Social Security Administration, Annual Statistical Supplement 2008 (March 2009), Table 4.c5, <http://www.ssa.gov/policy/docs/statcomps/supplement/2008/4c.html>; 2009 OASDI Trustees Report (March 24, 2004), Table VI.F4 and Chapter II.D, <http://www.ssa.gov/OACT/TR/2009>

## Bye-Bye, Confucius

Percentage of Age-60 Chinese Women with No Born Sons by Year of Her 60<sup>th</sup> Birthday: Illustrative Calculations

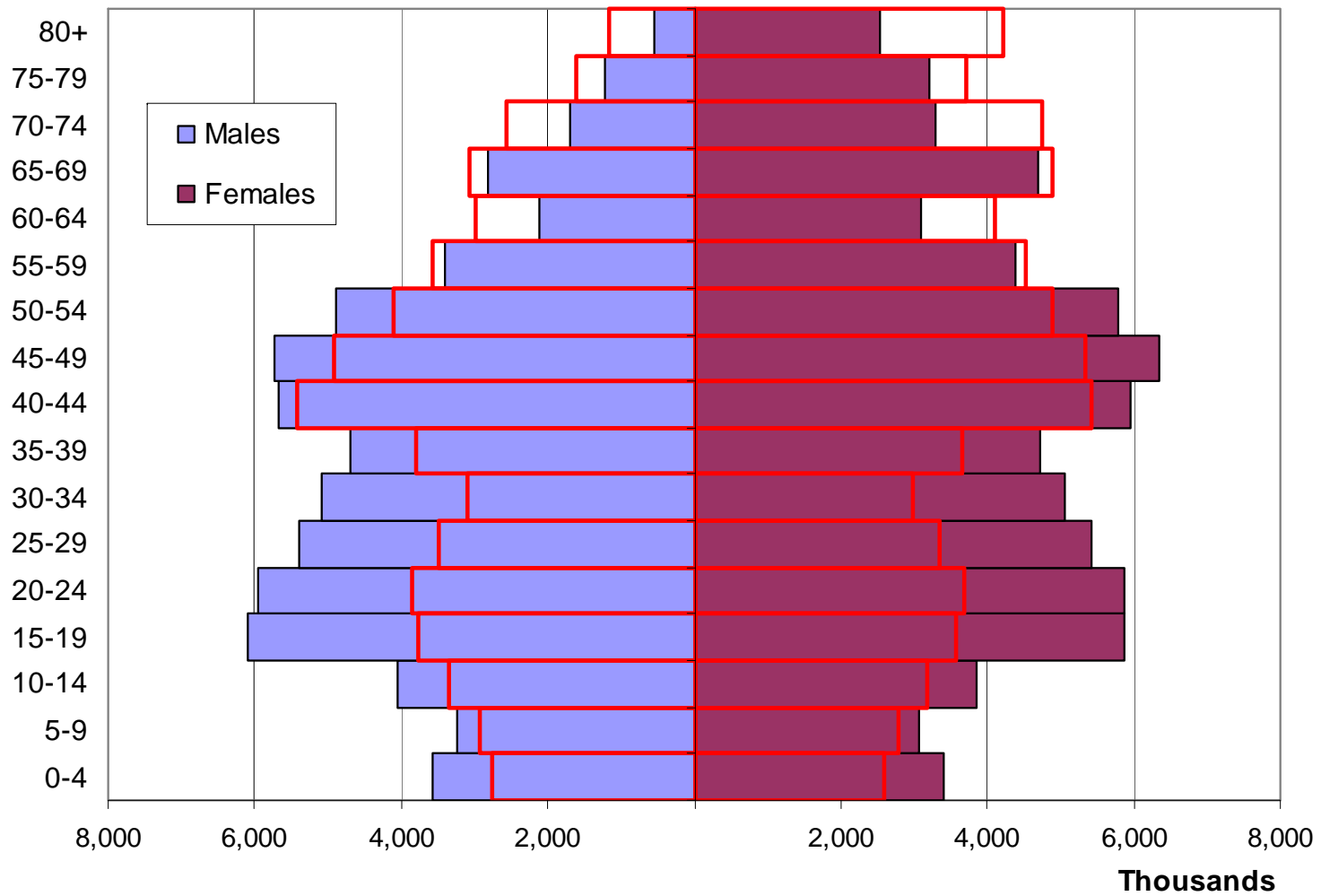


Notes: Calculations are illustrative, based upon simplifying assumptions: 1. Reported parity distributions in 1990 census are accurate; 2. SRB as in previous graphic; 3. SRB not parity-specific; 4. Childbearing completed by age 35 for the 2025 cohort of 60-year old women; 5) Posits the following distribution of childbearing for the 2025 cohort of 60-year-old women: no children, 3%; one child, 25%; two children, 65%; three or more children, 7%.

Sources: Derived from Feeney et. al. 1993, op cit; China National Bureau of Statistics 2002, op cit.

# Picture A Depopulation...

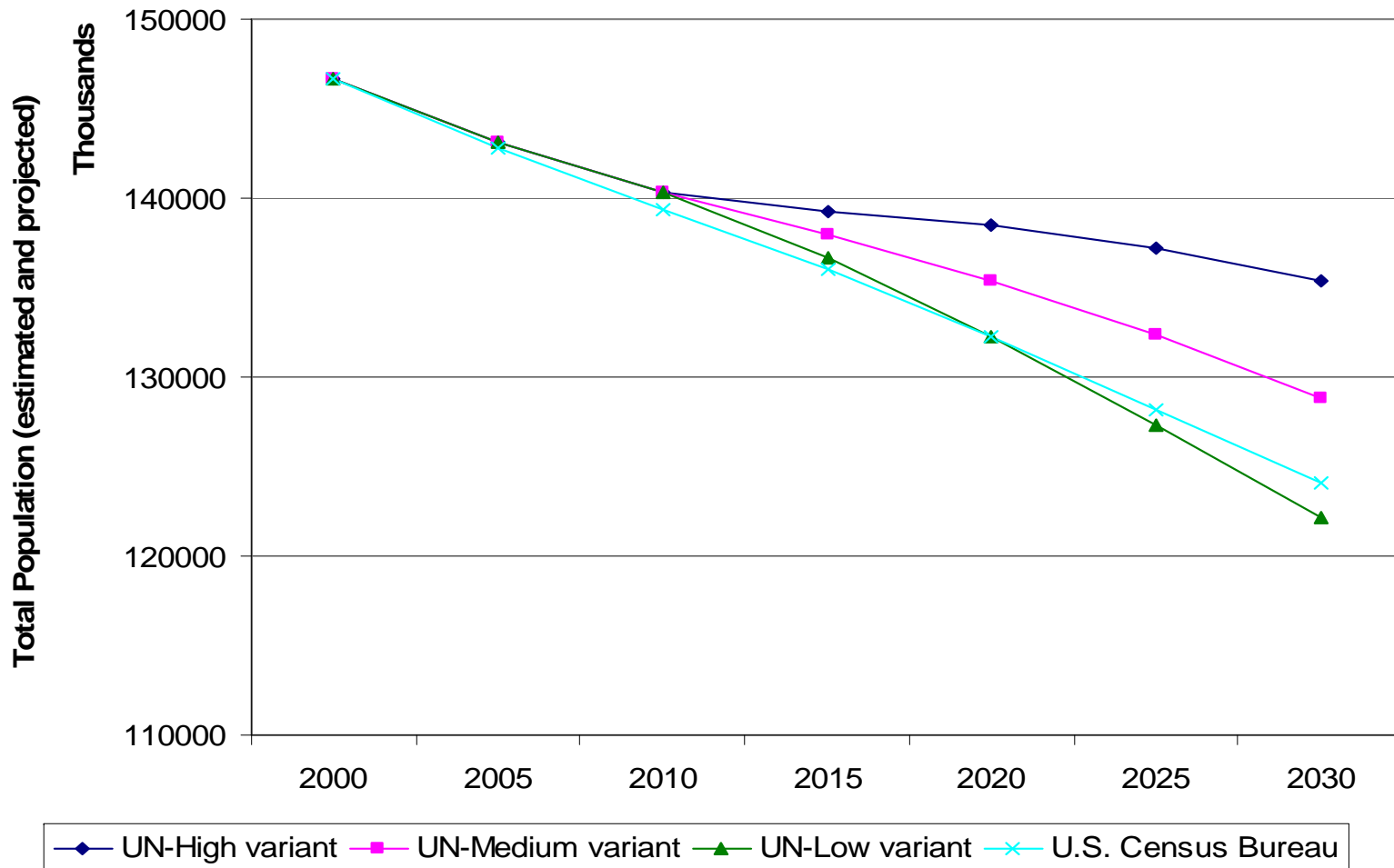
Estimated and Projected Population Structure: Russian Federation,  
2005 vs. 2030, U.S. Census Bureau Estimates



Source: US Census Bureau International Database. Available online at <http://www.census.gov/ipc/www/idbnew.html>, Accessed on March 2, 2009.

# Russian Federation: Dwindling Consensus

Estimated and Projected Population of Russia, 2000-2030, UN and U.S. Census Bureau

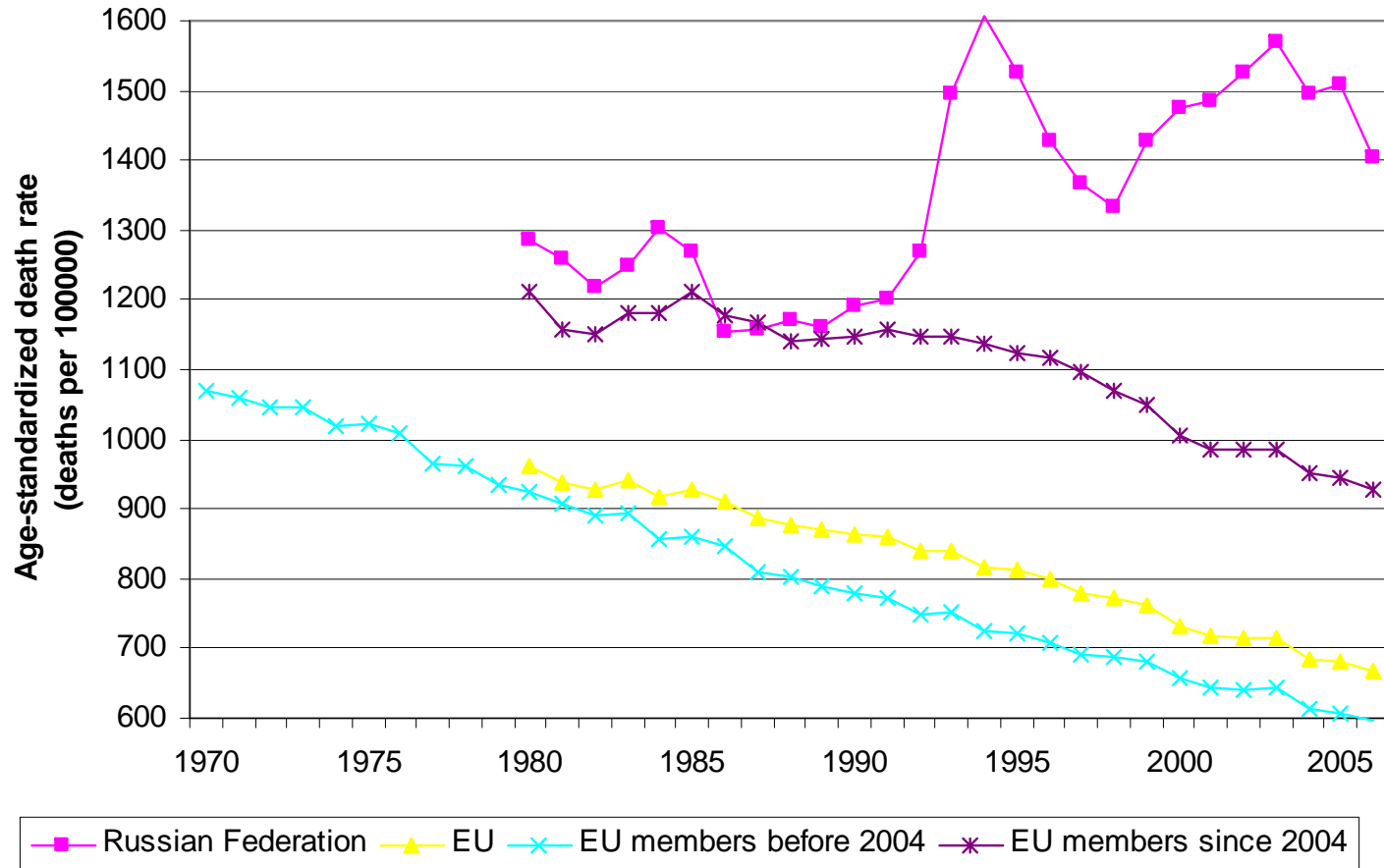


Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2008 Revision and World Urbanization Prospects: The 2007 Revision, <http://esa.un.org/unpp>, Tuesday, March 24, 2009

Source: US Census Bureau International Database. Available online at <http://www.census.gov/ipc/www/idbnew.html>, Accessed on March 2, 2009.

# Russia Leaves The West

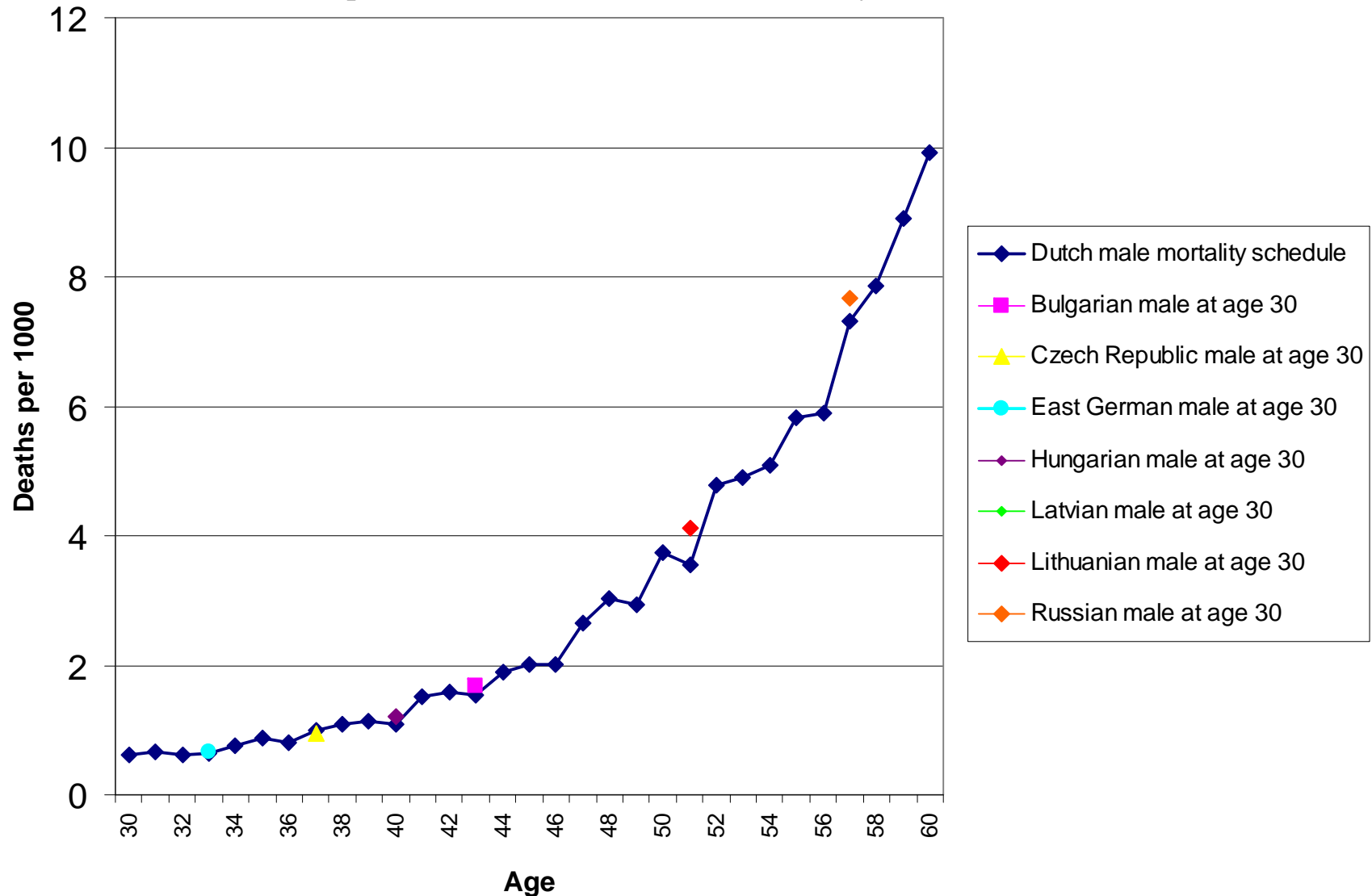
Death rates from all causes, Russia vs. EU, 1970-2006 (males plus females)



Source: Europe Health For All Database, World Health Organization, July 2008.

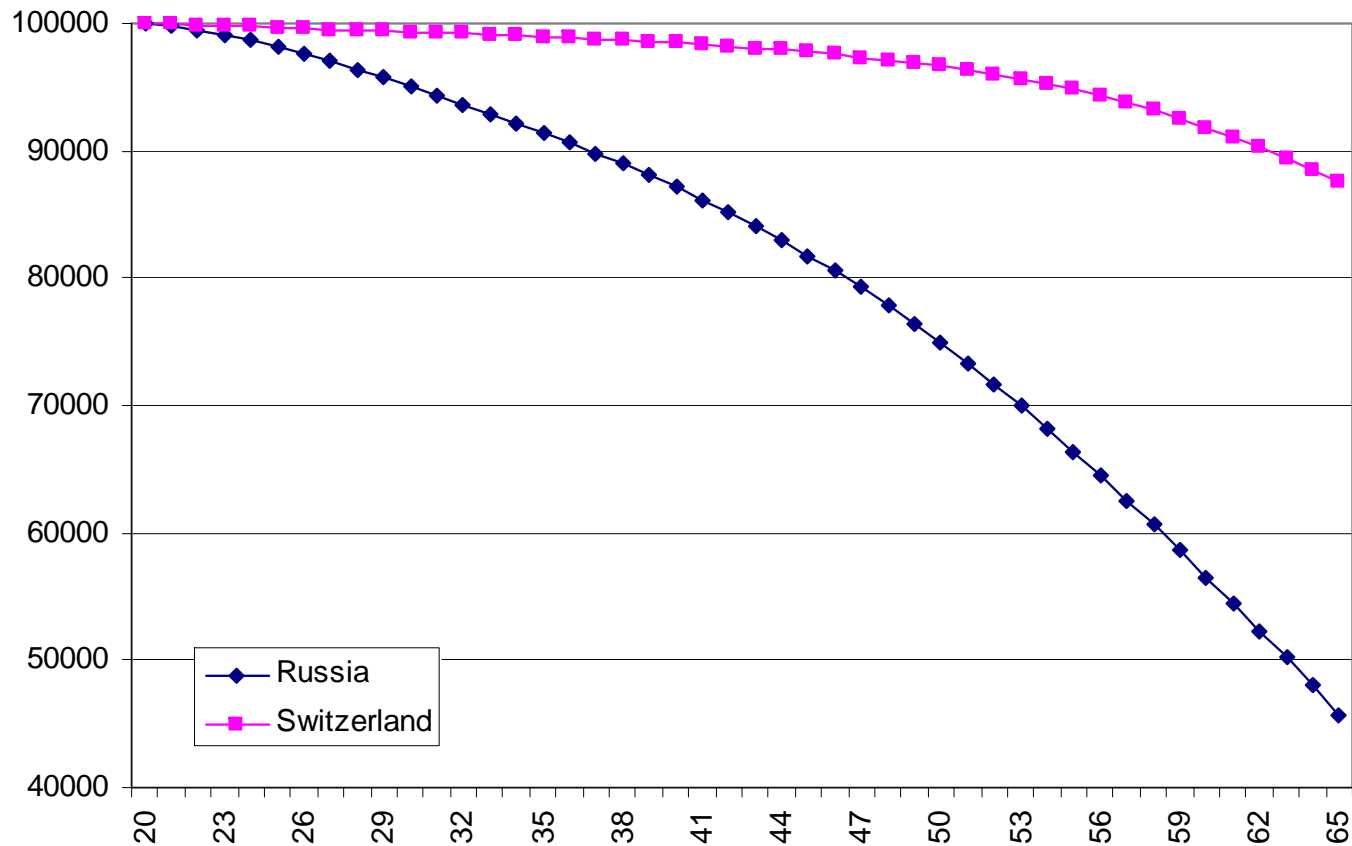
# 30 Is The New 57...In Russia

Mortality At Age 30 for Men In Selected Post-Socialist Countries  
Compared With The Dutch Male Mortality Schedule, c. 2004



# Who Wants To Live Forever, Anyhow?

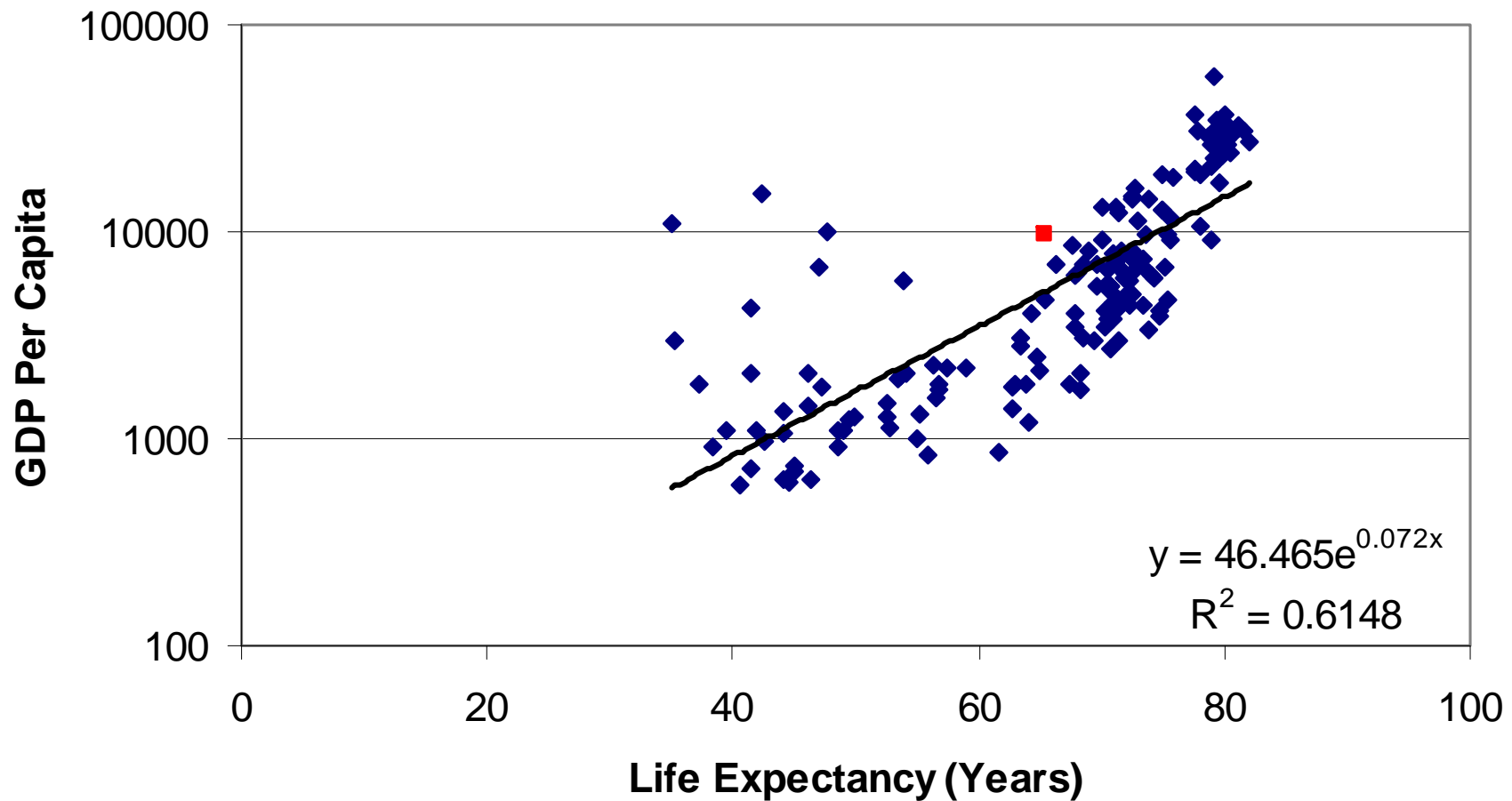
Male Survival Schedules, Ages 20-65:  
Russian Federation vs. Switzerland, 2006



Source: Human Mortality Database. University of California, Berkeley and Max Planck Institute for Demographic Research. Available at [www.mortality.org](http://www.mortality.org), accessed on November 7, 2008.

# Health Equals Wealth: International Life Expectancy vs. GDP Per Capita, 2005

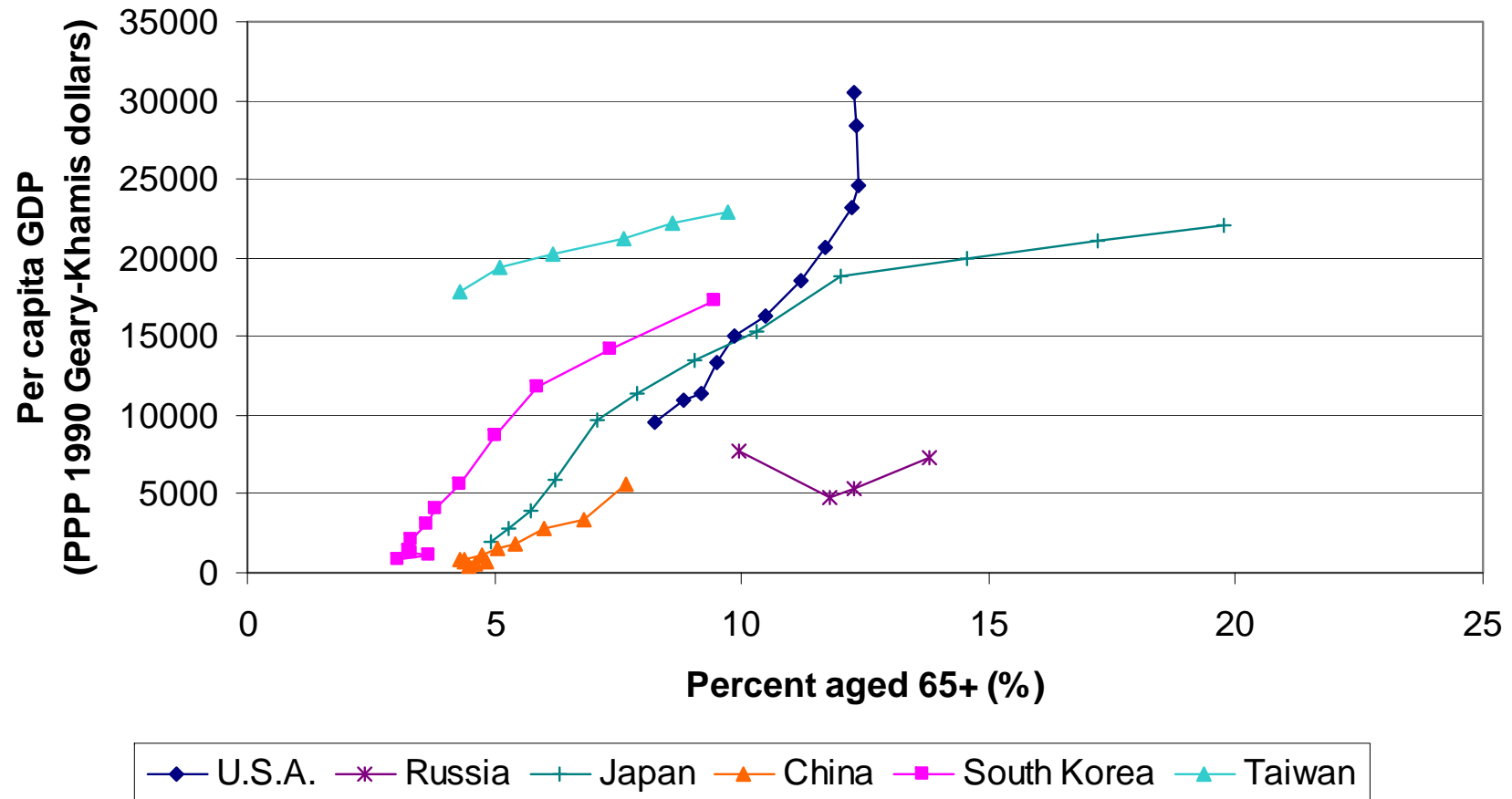
(LE for males and females together—Russian Federation in red)



Source: World Development Indicators 2008

# Aging on a Budget

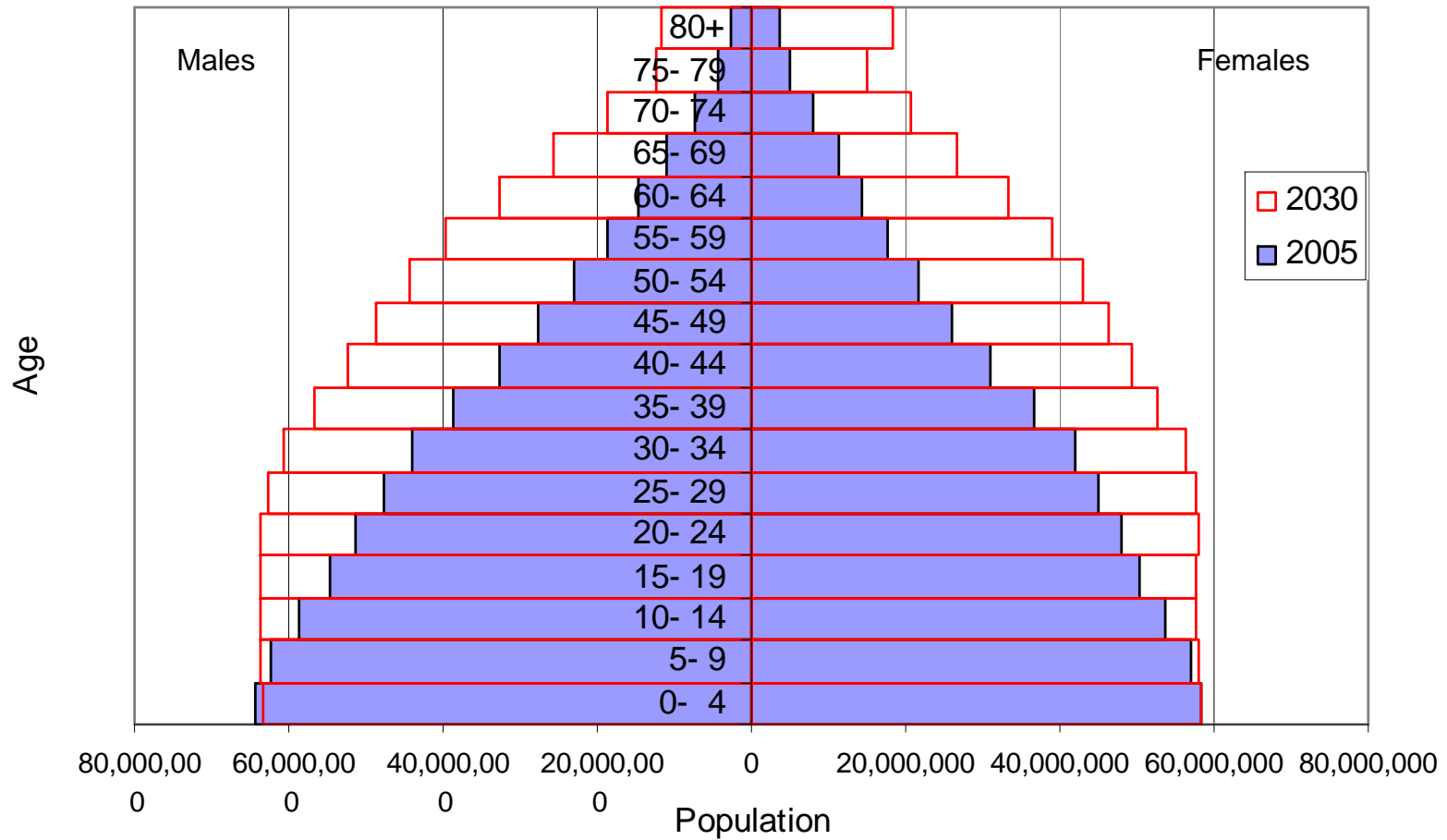
## Percent of population 65+ vs. Per capita GDP PPP: Russia and Selected Other Countries, 1950-2005 (Russia for 1995-2005)



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2006 Revision and World Urbanization Prospects: The 2005 Revision, <http://esa.un.org/unpp>, Monday, January 26, 2009; 3:31:49 PM; Angus Maddison, "Per Capita GDP PPP (in 1990 Geary-Khamis dollars)," *Historical Statistics for the World Economy: 1-2006 AD*, table 3, <http://www.ggd.net/maddison/> (accessed January 27, 2009).

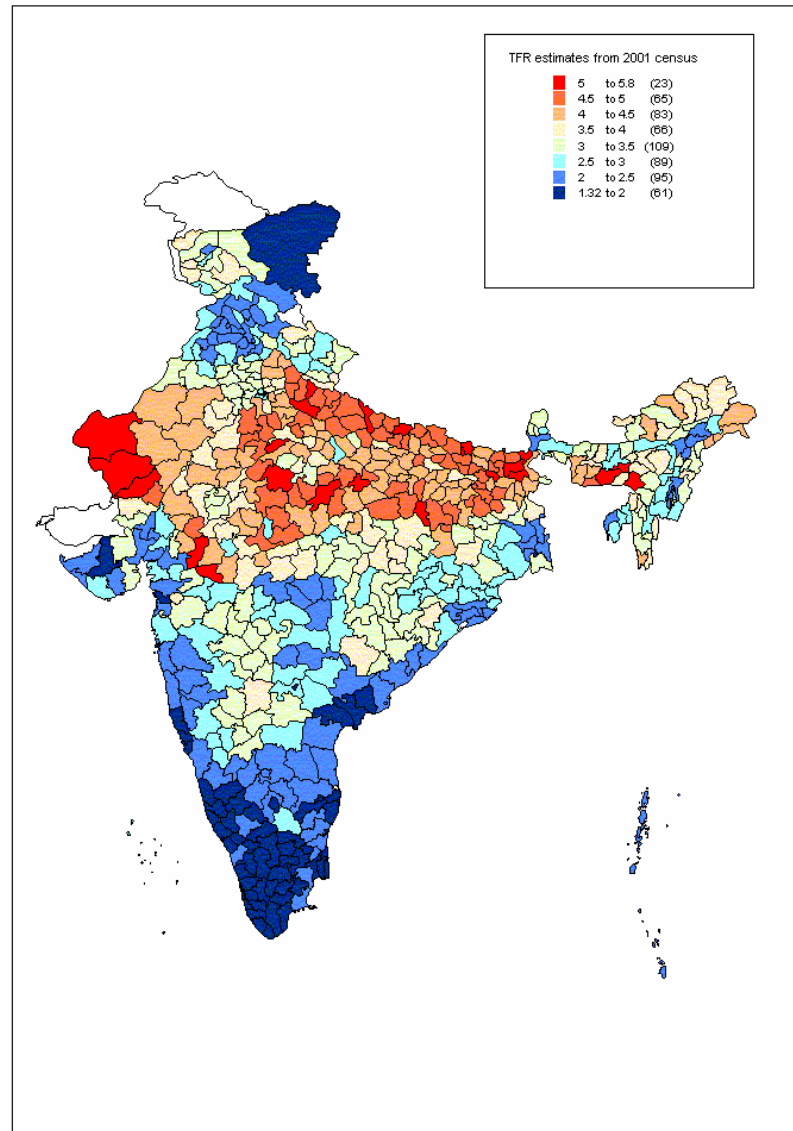
Taiwan Population: *Statistical Yearbook of the Republic of China (Taiwan)*, "Table 10. Age-specific distribution of population, dependency ratio, index of aging and median age", available at <http://eng.dgbas.gov.tw/lp.asp?CtNode=2351&CtUnit=1072&BaseDSD=36>.

# Estimated and Projected Population Structure: India, 2005 vs. 2030



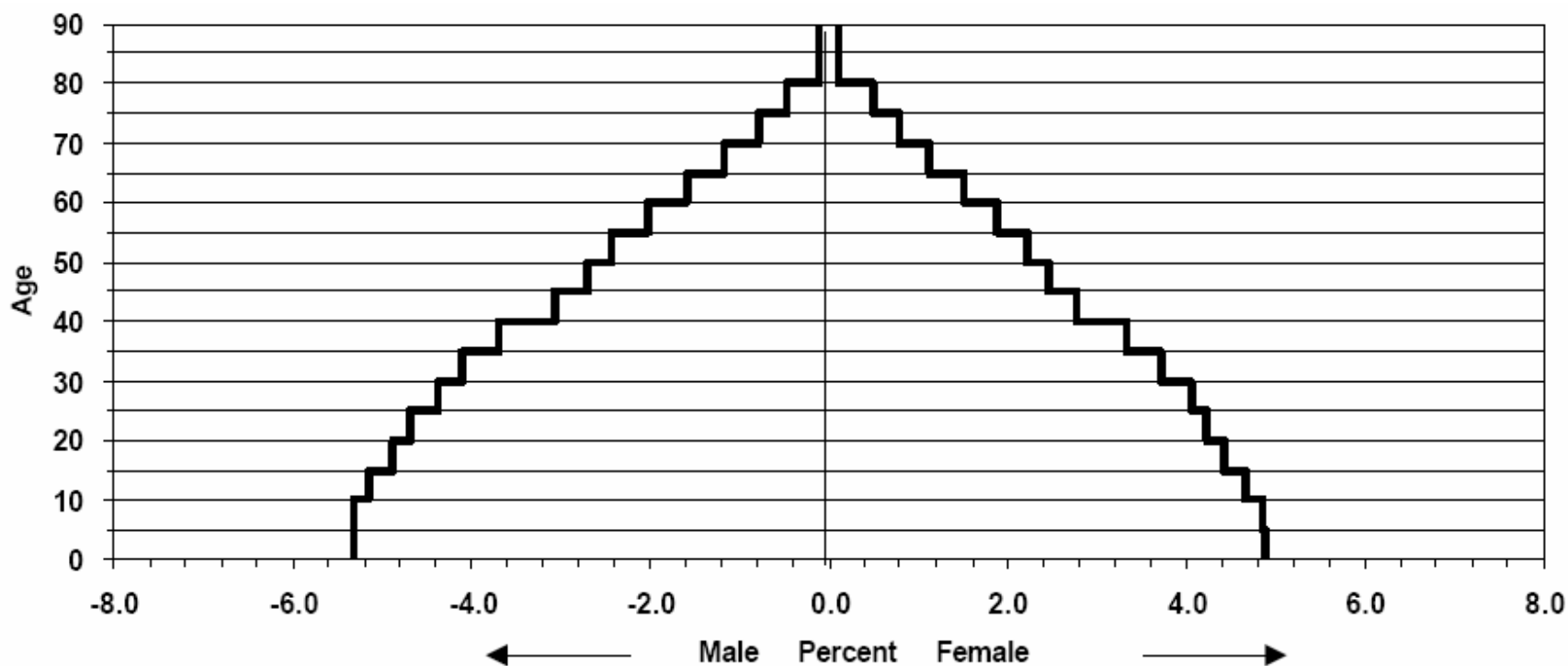
Source: U.S. Census Bureau, International Data Base (accessed May 13, 2008).

# Fertility Map of India: 2001



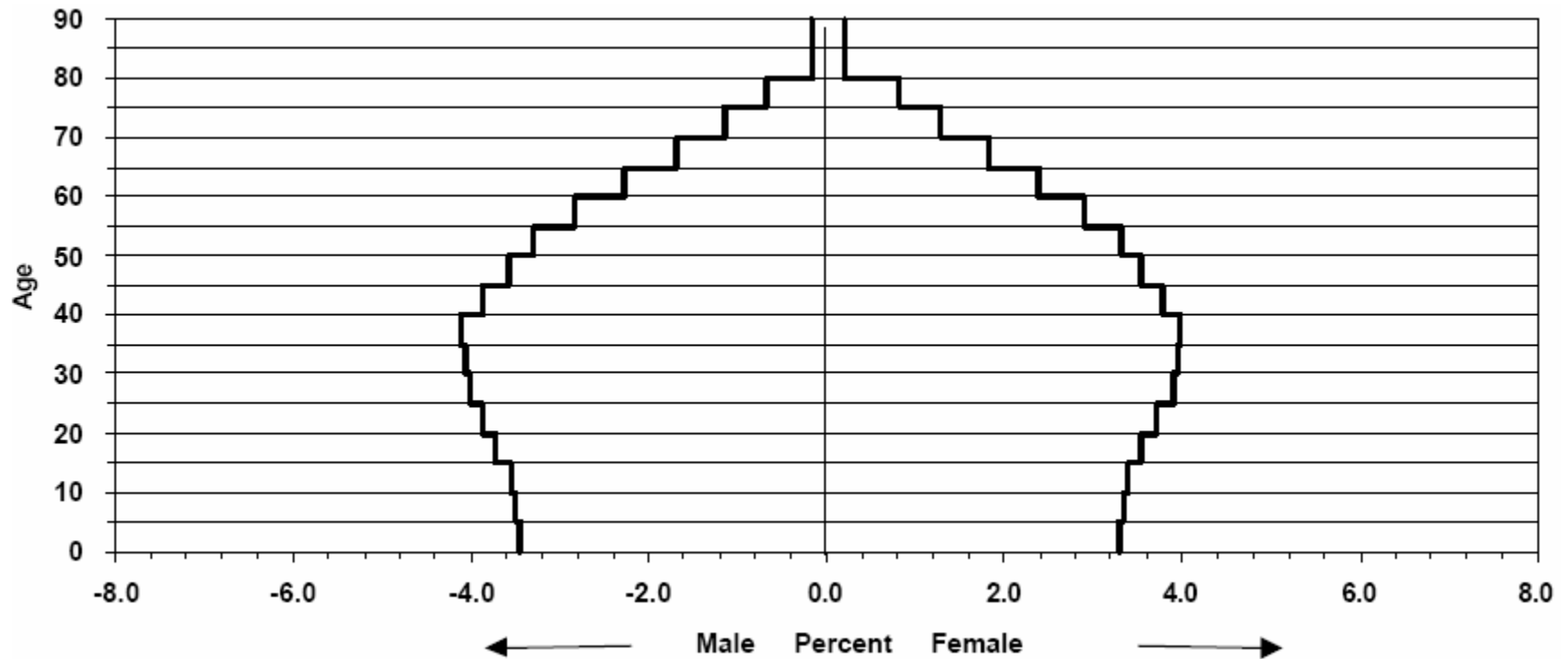
Source: Christophe Z. Guilmoto et al., South India Fertility Project, <http://www.demographie.net/sifp/maps/TFR2001.gif>

## Projected Population Structure for North India, 2025



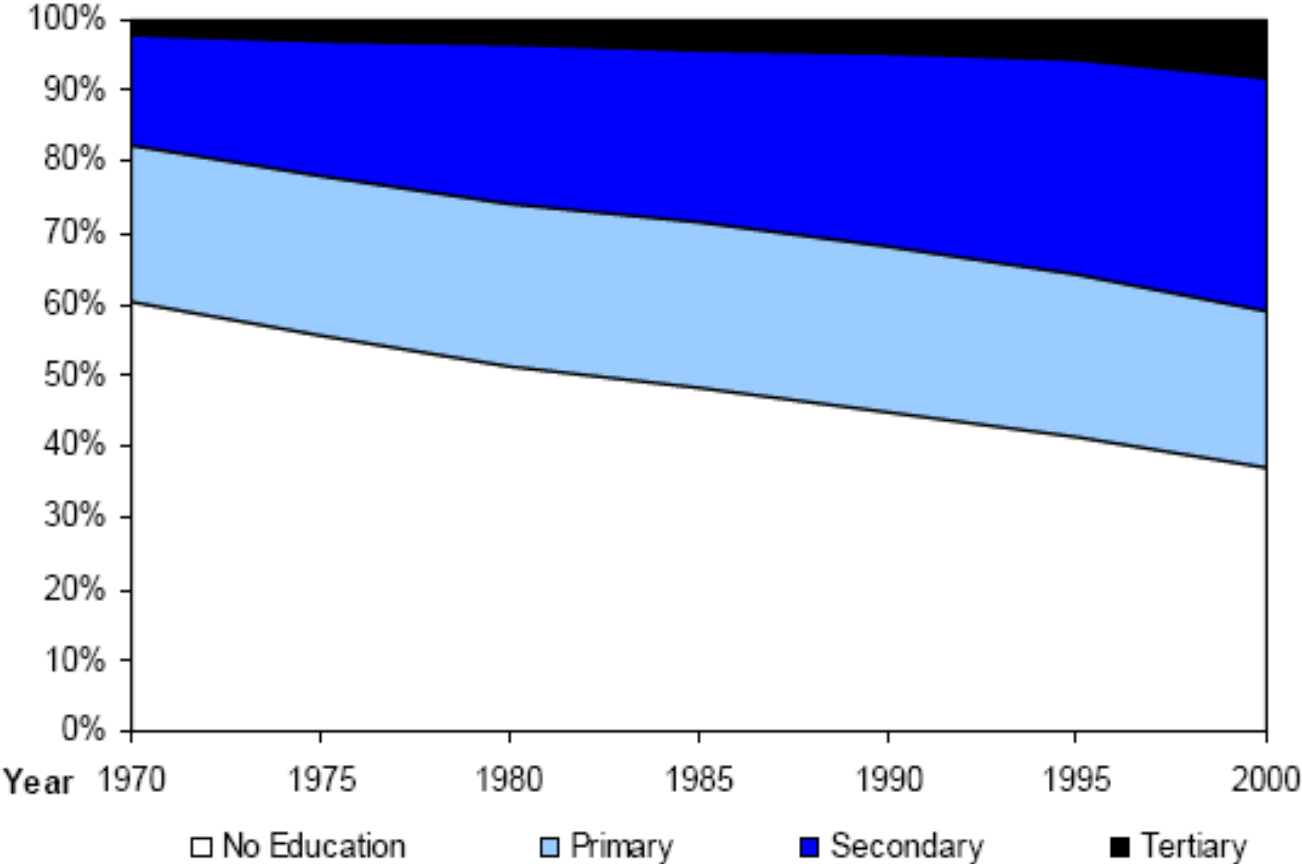
Source: Bhat, P.N. Mari, "Demographic scenario, 2025." Institute of Economic Growth, Delhi, Figure 5. Available online at <http://planningcommission.nic.in/reports/sereport/ser/vision2025/demogra.pdf> accessed May 2005.

## Projected Population Structure for South India, 2025



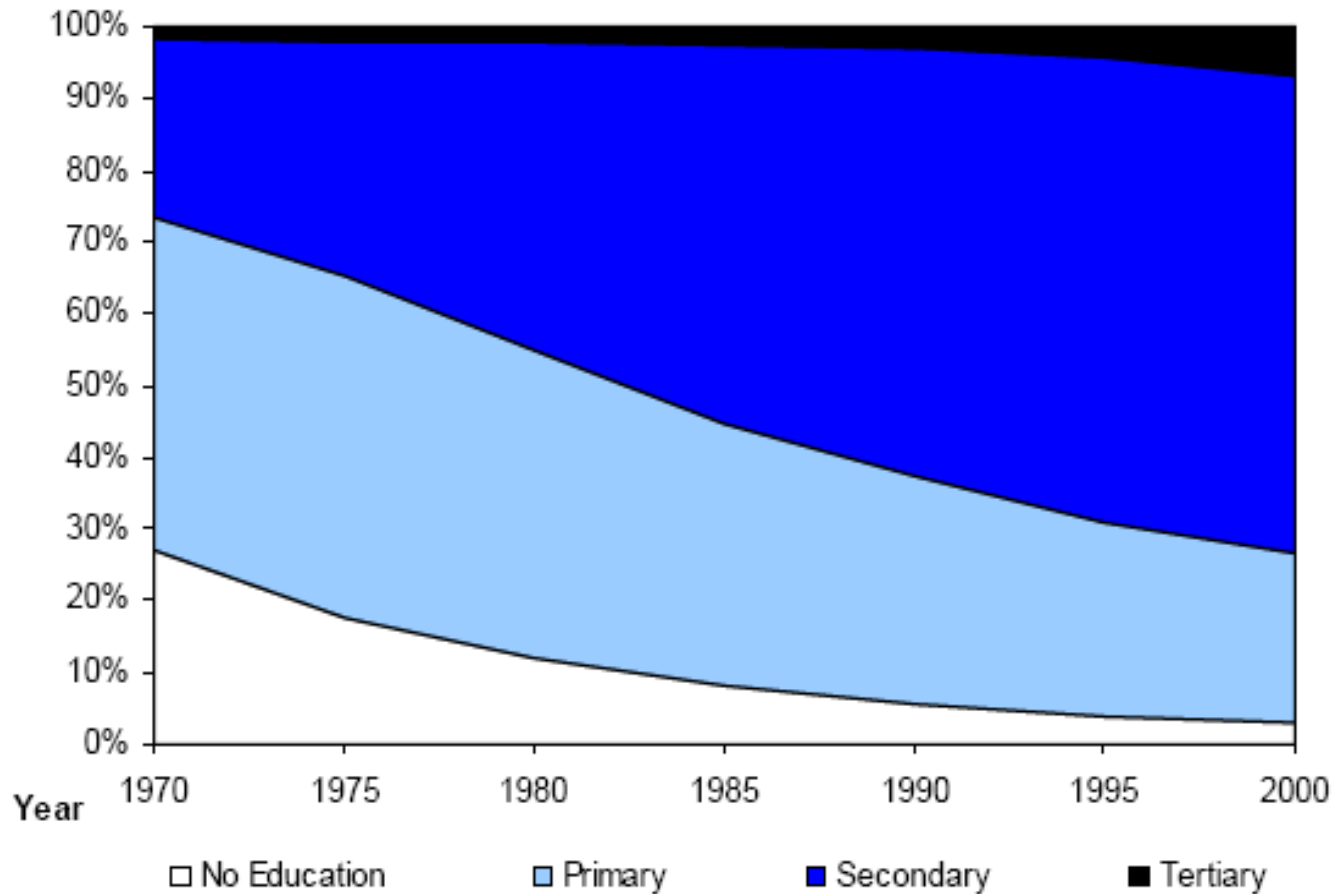
Source: Bhat, P.N. Mari, "Demographic scenario, 2025." Institute of Economic Growth, Delhi, Figure 6. Available online at <http://planningcommission.nic.in/reports/sereport/ser/vision2025/demogra.pdf> accessed May 2005.

# Proportion Distribution by Education for Population Ages 20-39 in India: 1970-2000



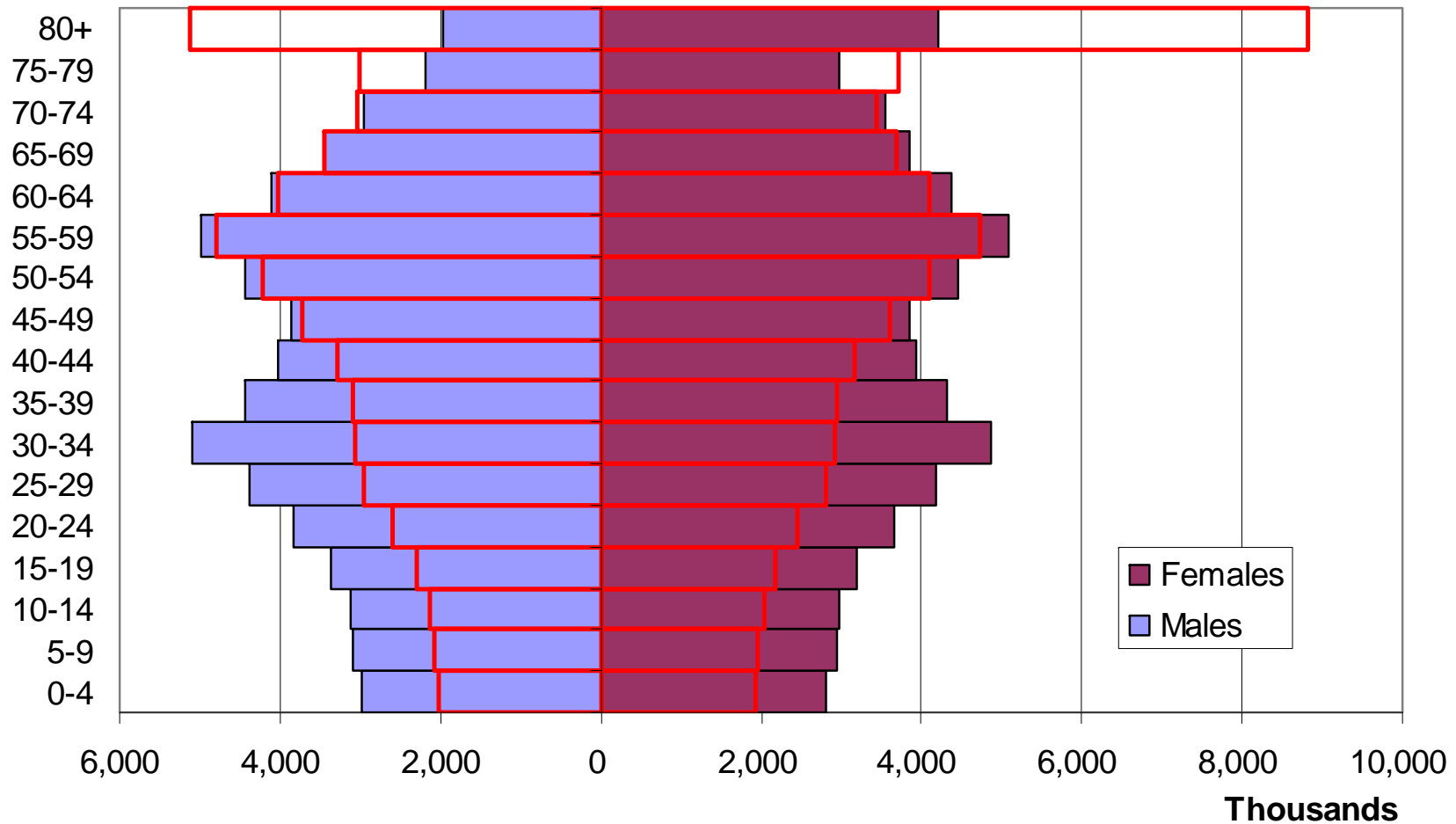
Source: Wolfgang Lutz, Anne Goujon, Samir K.C., and Warren Sanderson, "Reconstruction of Populations by Age, Sex, and Level of Educational Attainment for 120 Countries for 1970-2000," Vienna Yearbook of Population Research 2007: 193-235.

# Proportion Distribution by Education for Population Ages 20-39 in China, Macao, and Hong Kong: 1970-2000



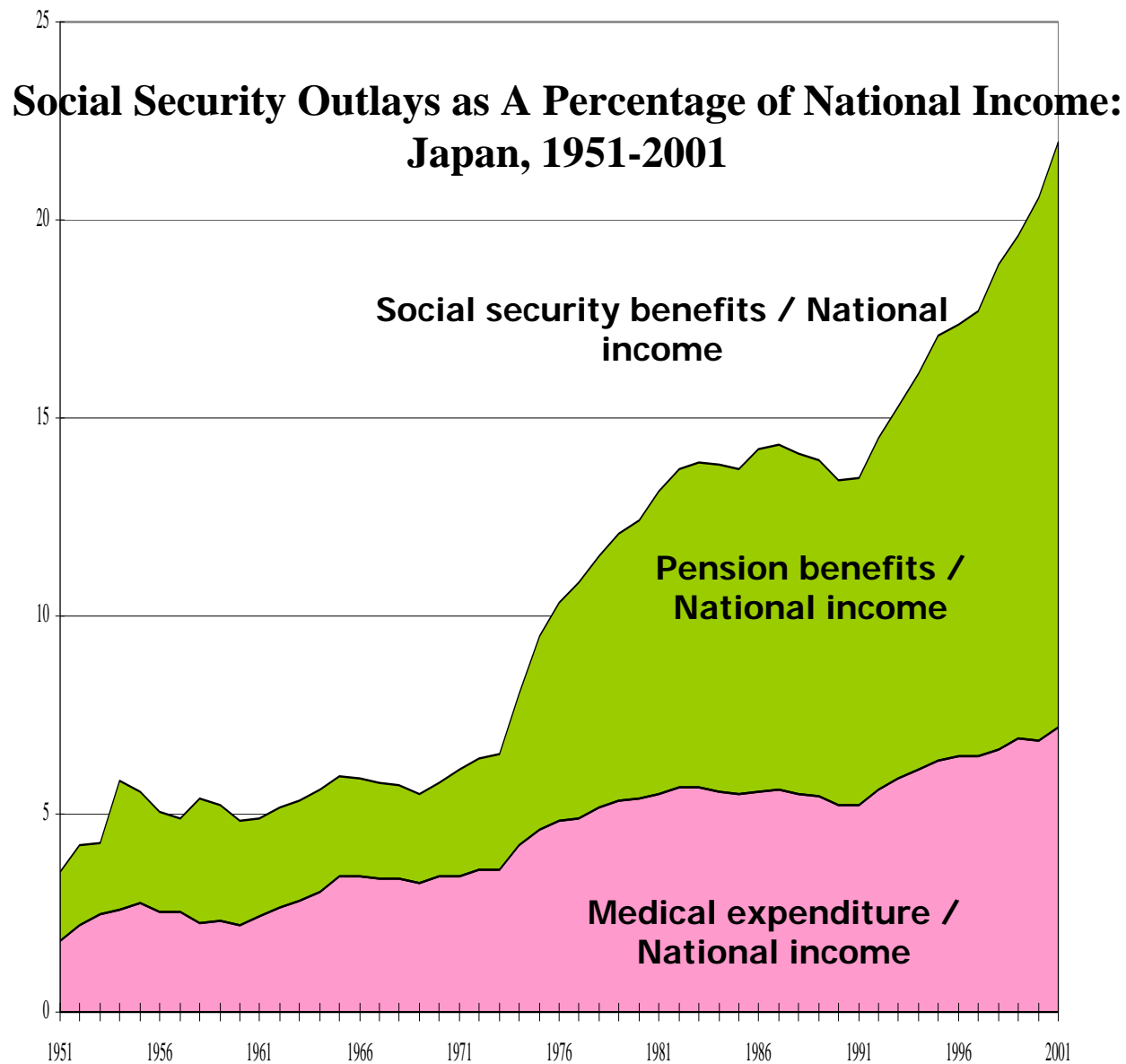
Source: Wolfgang Lutz, Anne Goujon, Samir K.C., and Warren Sanderson, "Reconstruction of Populations by Age, Sex, and Level of Educational Attainment for 120 Countries for 1970-2000," Vienna Yearbook of Population Research 2007: 193-235.

## Estimated and Projected Population Structure: Japan, 2005 vs. 2030



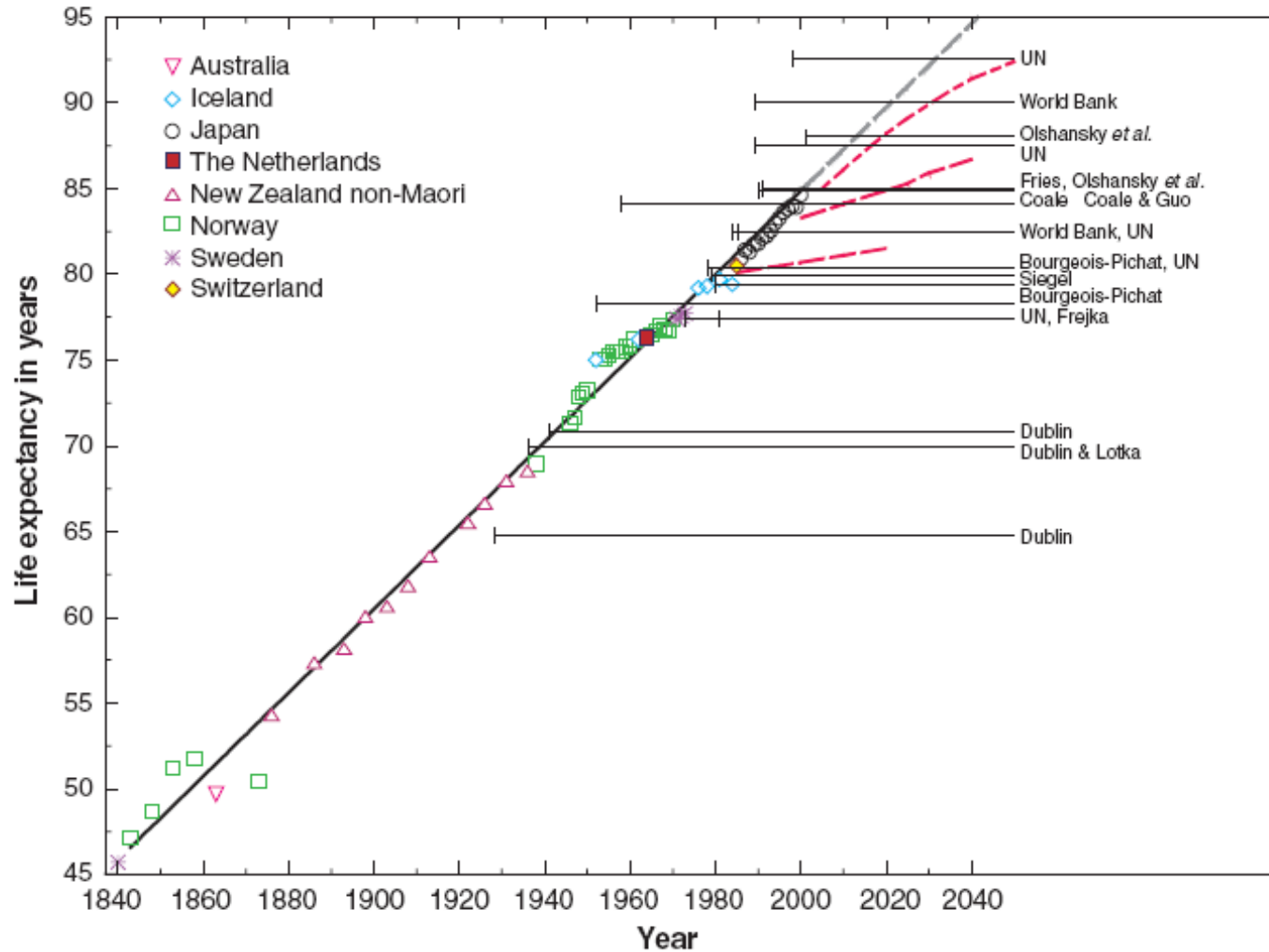
Source: U.S. Census Bureau, International Data Base.

<http://www.census.gov/ipc/www/idb/tables.html>, Accessed January 25, 2009



Naohiro Ogawa, Nihon University, Population Research Institute, 2005 George Myers Memorial Lecture, "Health and its impact on work and dependency among the elderly in graying Japan"

# Record Female Life Expectancy, 1840-Present

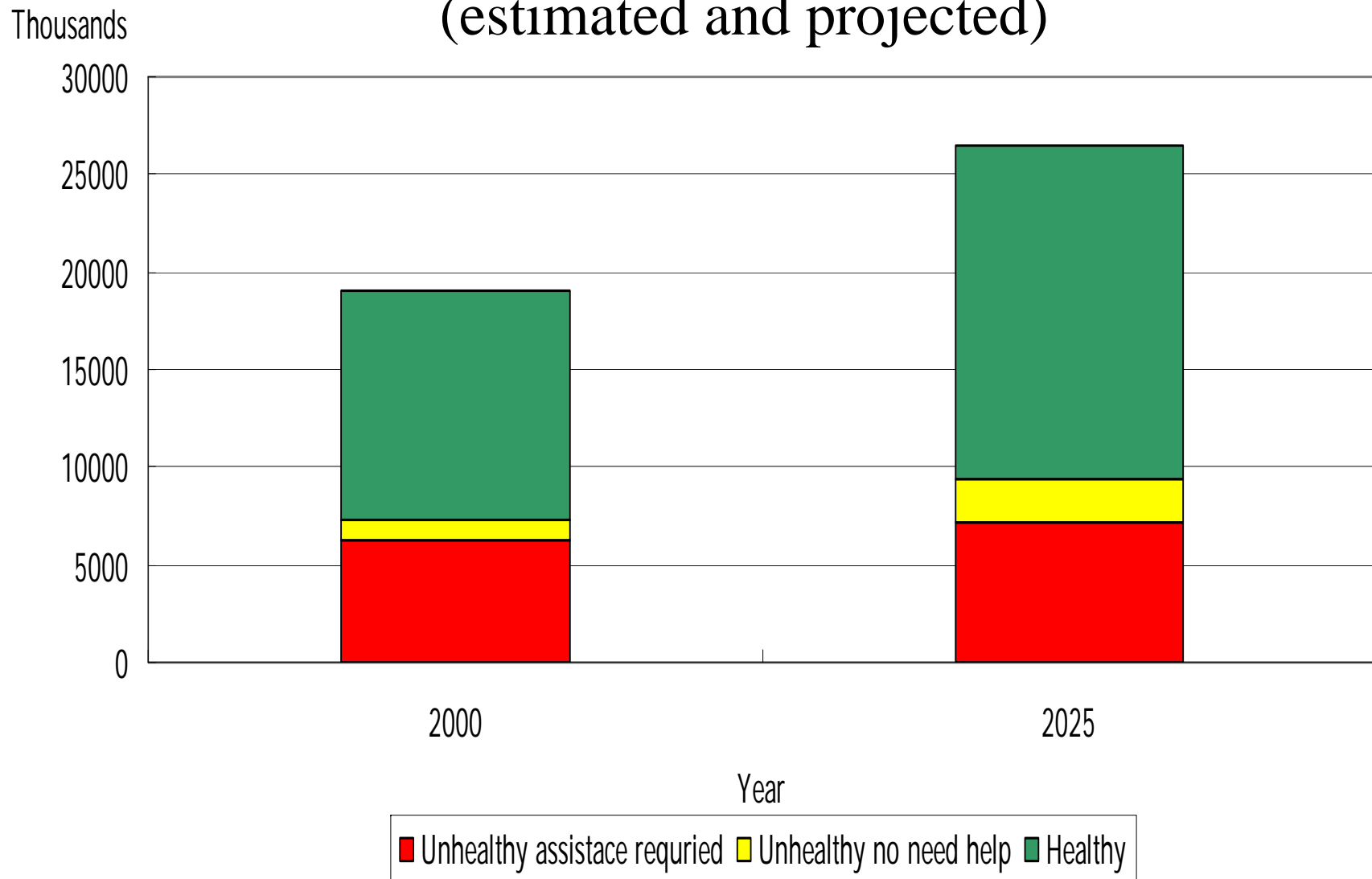


Source: Vaupel, James W. and Jim Oeppen, "Broken Limits to Life Expectancy," *Science*, May 10, 2002

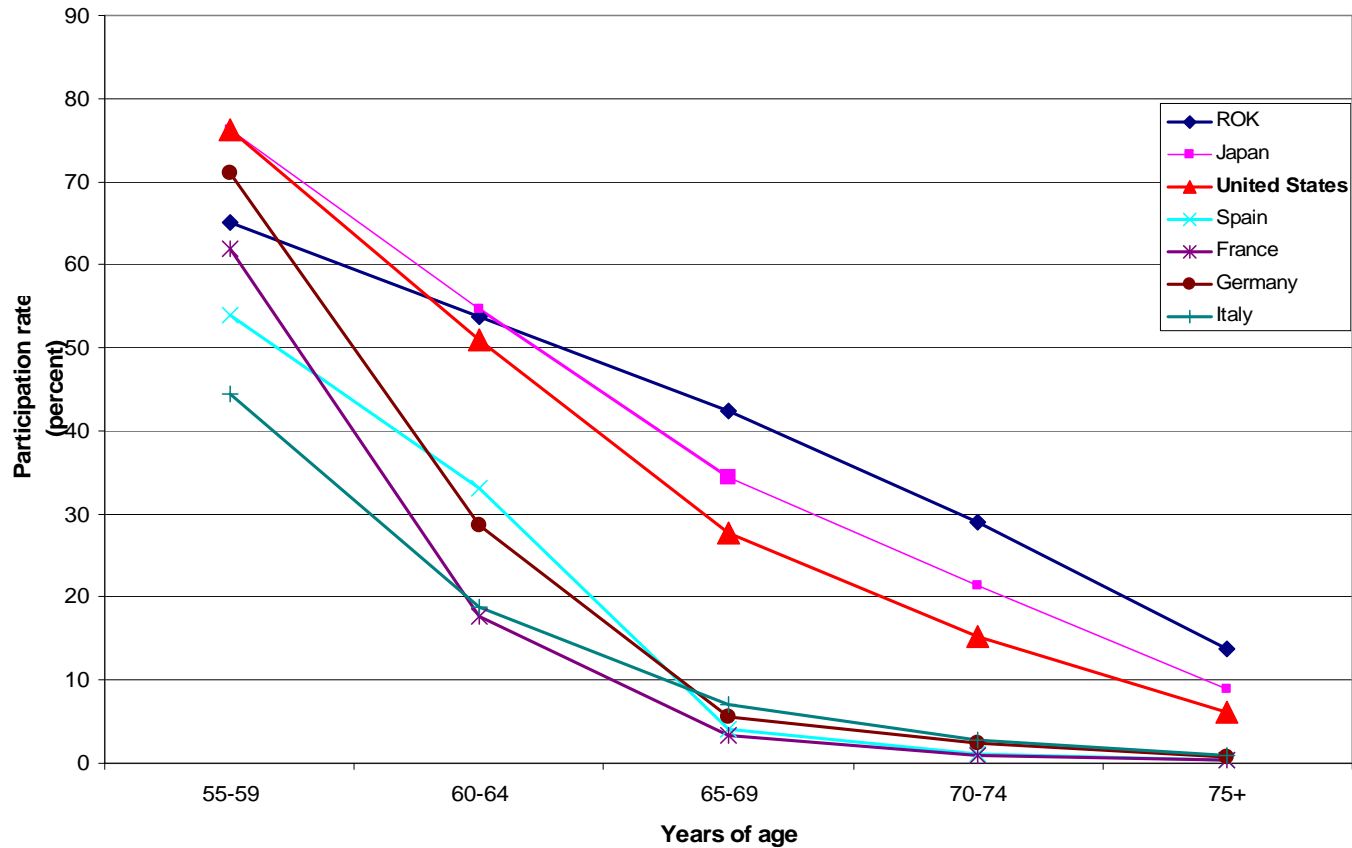
Note: The horizontal black lines show asserted ceilings on life expectancy, with a short vertical line indicating the year of publication. The dashed red lines denote projections of female life expectancy in Japan published by the United Nations in 1986, 1999, and 2001.

# Elderly population by health status, Japan 2000-25

(estimated and projected)



## Labor Force Participation Rates: Select Western Europe vs. Non-Europe OECD



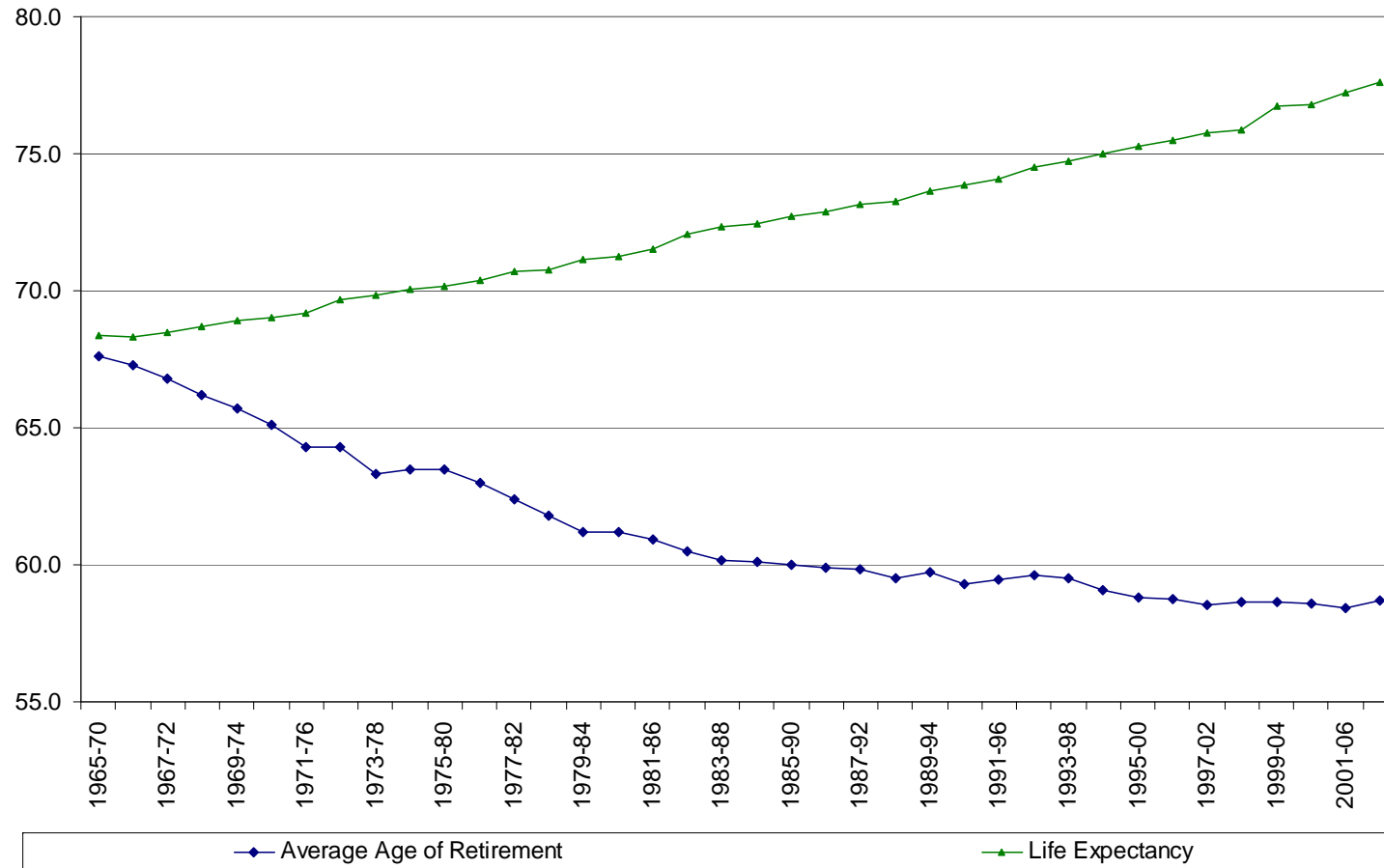
Source: International Labour Organization, LABORSTA Internet, <http://laborsta.ilo.org/>.  
Note: Data are for 2006, except for France (2005).

# Economic Projections from NUPRI Model

Item	Base Case	Base Case	More Older Workers
	2005	2025	2025
Real GDP(Trillion Yen)	564.7	624.8	693.8
Real GDP Per Capita (million yen)	4.43	5.2	5.74

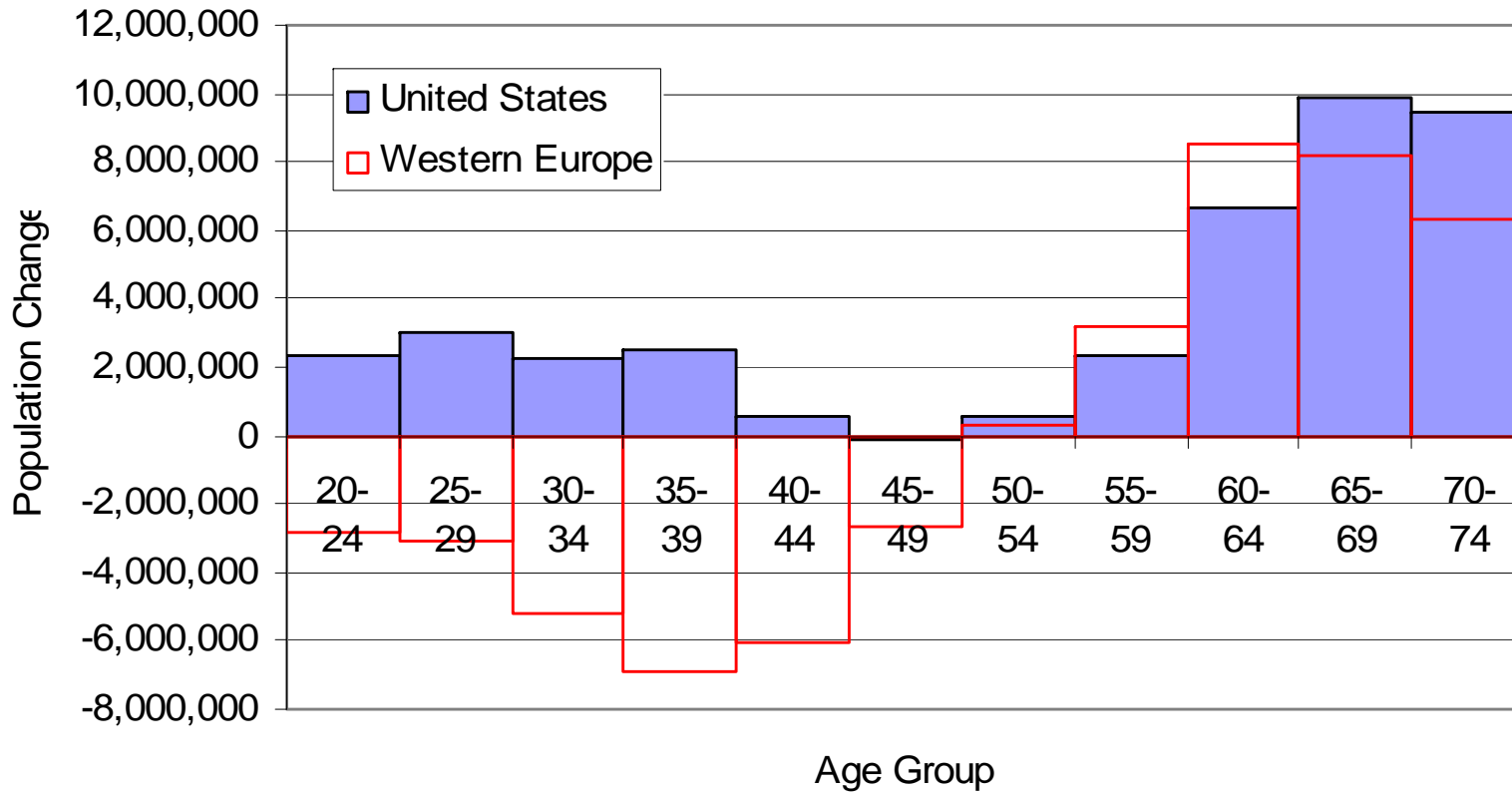
Naohiro Ogawa, Nihon University, Population Research Institute, 2005 George Myers Memorial Lecture, "Health and its impact on work and dependency among the elderly in graying Japan"

# Life Expectancy vs. Average Age of Retirement: Males, France, 1965-2007 (years)



Source: Average age of retirement data from “Statistics on average effective age and official age of retirement in OECD countries,” [http://www.oecd.org/document/47/0,3343,en\\_2649\\_34747\\_39371887\\_1\\_1\\_1\\_37419,00.html](http://www.oecd.org/document/47/0,3343,en_2649_34747_39371887_1_1_1_37419,00.html); OECD estimates based on the results of national labor force surveys, the European Union Labor Force Survey and, for earlier years in some countries, national censuses. Life expectancy data from Human Mortality Database. University of California, Berkeley and Max Planck Institute for Demographic Research. Available at [www.mortality.org](http://www.mortality.org), accessed on November 7, 2008. 2007 Data from US Census Bureau, International Database, <http://www.census.gov/cgi-bin/ipc/idbagg>

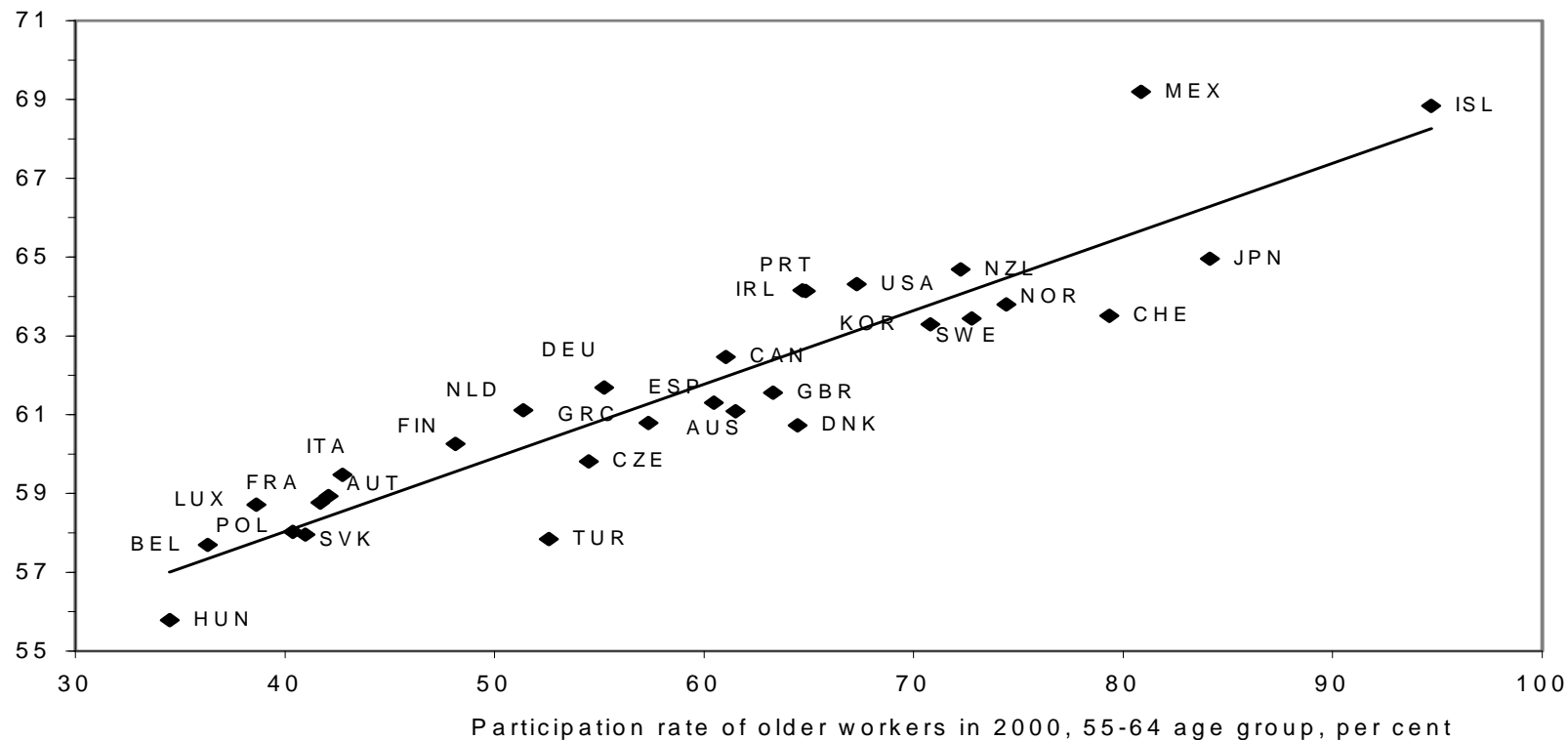
# Projected Population Change for Economically Active Age Groups: Western Europe vs. USA, 2005-2030



Source: U.S. Census Bureau, International Data Base, <http://www.census.gov/cgi-bin/ipc/idbagg> [accessed July 7, 2008].

# Labor Force Participation of Older Workers and Estimated Effective Retirement Age in 2000 (Males)

Effective retirement age, 2000



Correlation coefficient: 0.92 \*\*

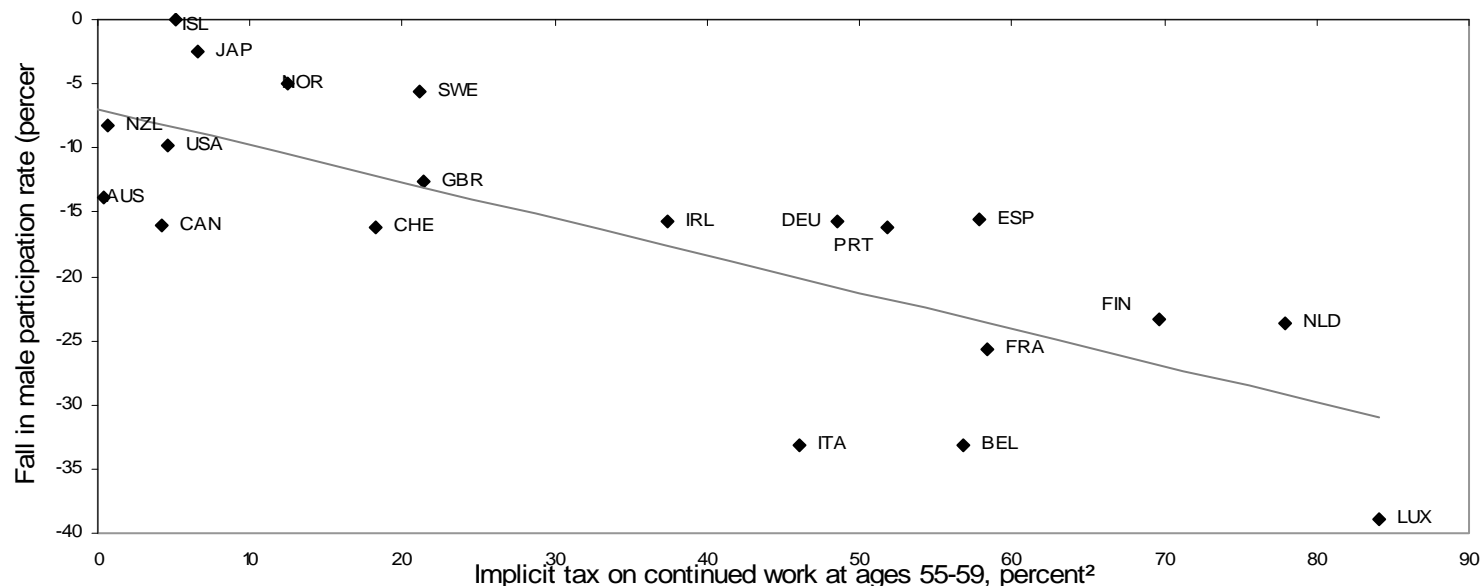
\*\* significant at the 1% level.

Sources: Labour Force Statistics (Part III) and Burniaux *et al.* (2003).

Source: Duval, Romain. "The Retirement Effects of Old-Age Pension and Early Retirement Schemes in OECD Countries." *Organisation for Economic Co-operation and Development*. 23 November 2003.

# Incentives to Retire and Retirement Behavior

## Fall in male labor force participation between ages 50-54 and 55-59

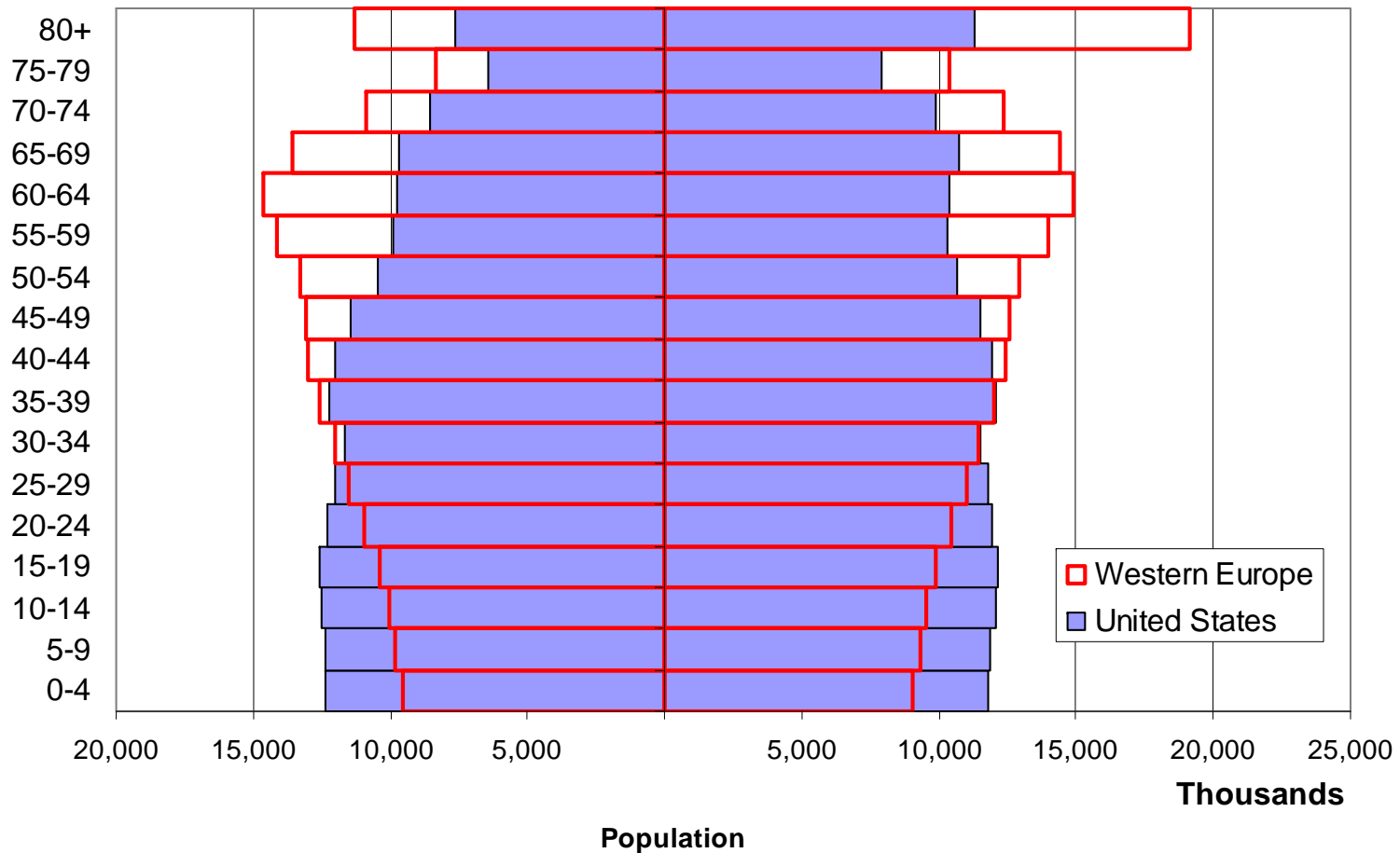


1. Difference in participation rates between the age groups 55-59 and 50-54 as a percentage of the participation rate of those ages 50-54 years.

2. The implicit tax on working an additional year is the forgone transfer/pension income plus the additional pension contributions paid, minus any increase in future pensions as a result of delayed retirement, all expressed as a share of income from work. The calculations in all cases take account of the "regular" old-age pension scheme but consider somewhat different early retirement pathways depending on the country in question or, where such schemes do not apply widely, no such pathways.

Source: Figure and text from Geir H. Haarde, "Strengthening Growth and Public Finances in an Era of Demographic Change" (background paper, Organisation for Economic Co-operation and Development, Paris, France, May 13-14, 2004). Original data from Romain Duval, "The Retirement Effects of Old-Age Pension and Early Retirement Schemes in OECD Countries" (working paper 370, Organisation for Economic Co-operation and Development, economics department, Paris, France, November 2003).

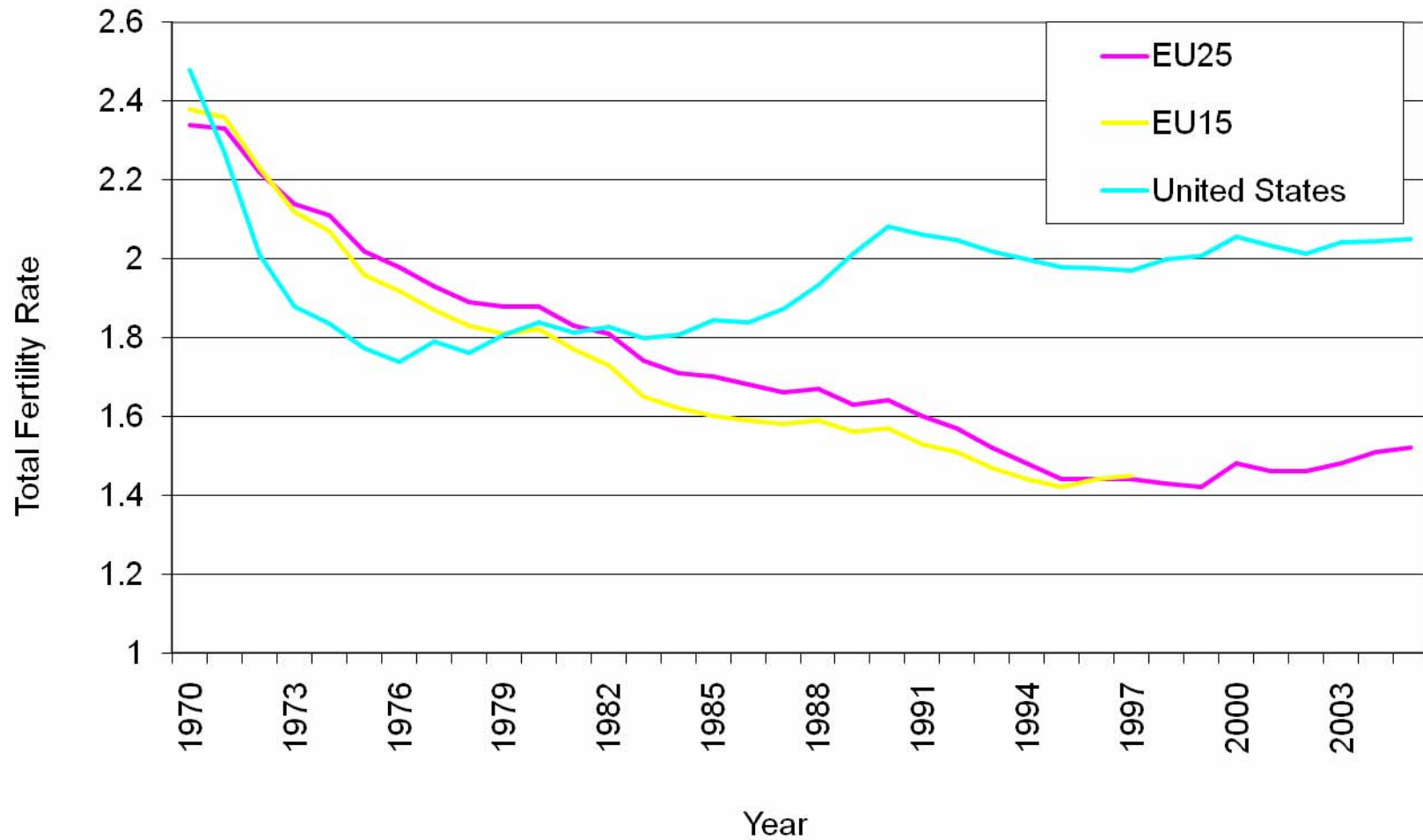
# Population Structure: Western Europe v. USA, 2030 (projected)



Note: "Western Europe" as defined in unofficial US Census Bureau taxonomy.

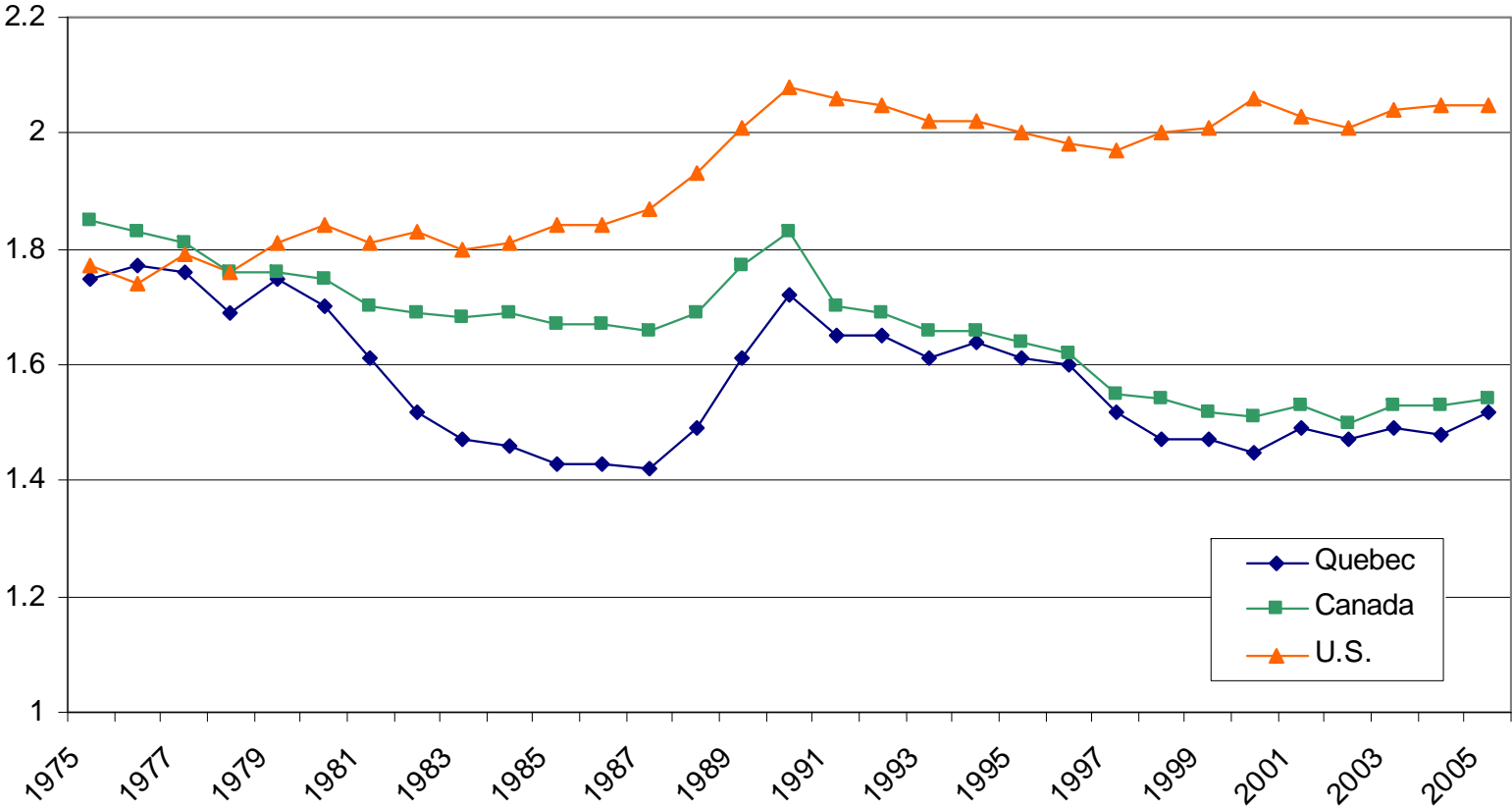
Source: U.S. Bureau of the Census International Database, available online at <http://www.census.gov/ipc/www/idb/tables.html>, accessed March 29, 2009.

## Total Fertility Rates: EU25 and EU15 v. United States, 1970-2005



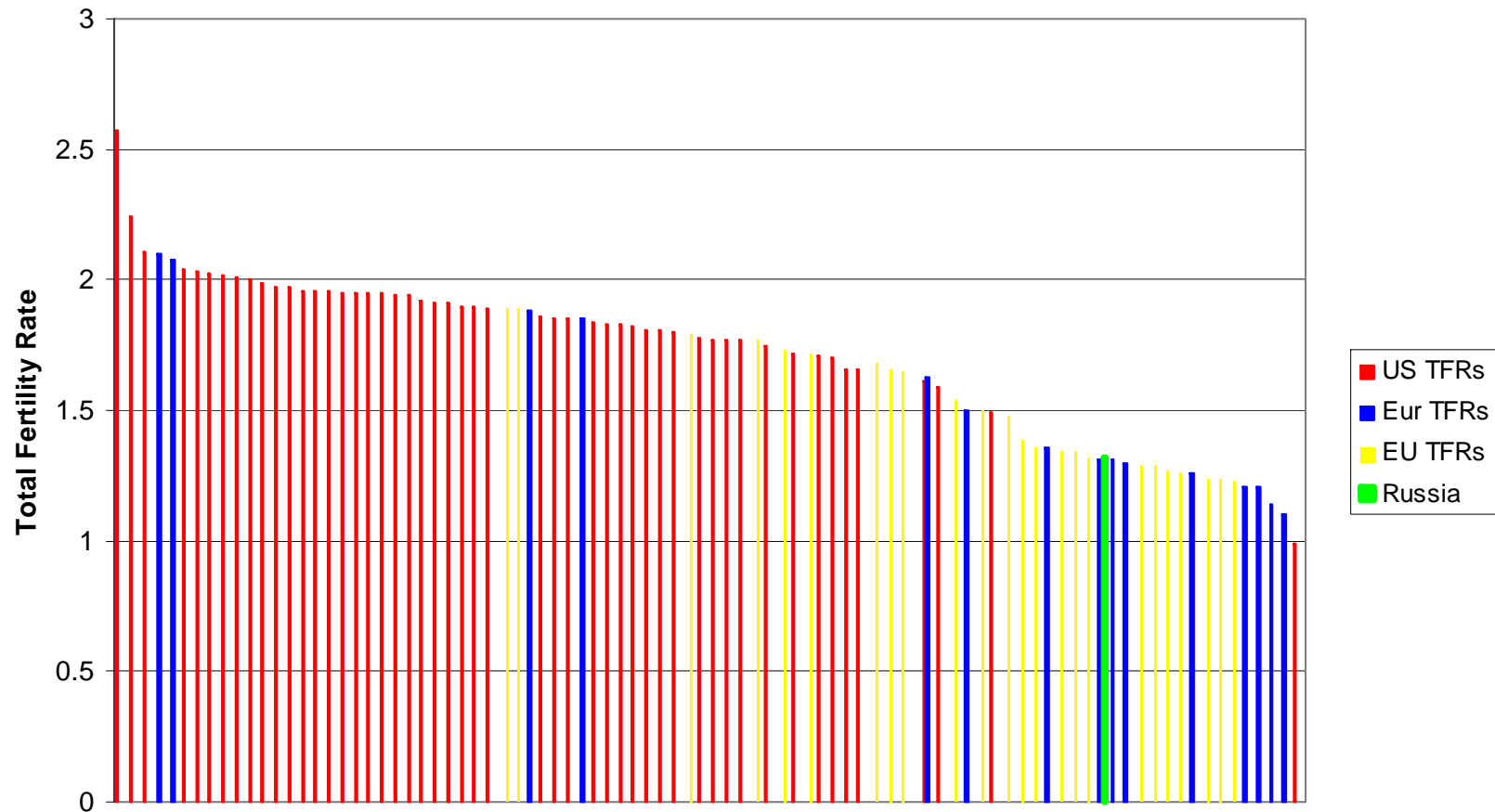
Source: Eurostat and Martin, Joyce A. et. al. "Births: Final Data for 2005." National Vital Statistics Reports, Volume 56, Number 6, December 5, 2007.

# US “Demographic Exceptionalism”: TFRs, Canada vs. USA, 1975-2005



Source: Statistics Canada, Current Demographic Analysis: Fertility in Canada 1984, 130; Report on the Demographic Situation 2005 and 2006, 39. U.S. National Vital Statistics Report 56:6 (December 2007).

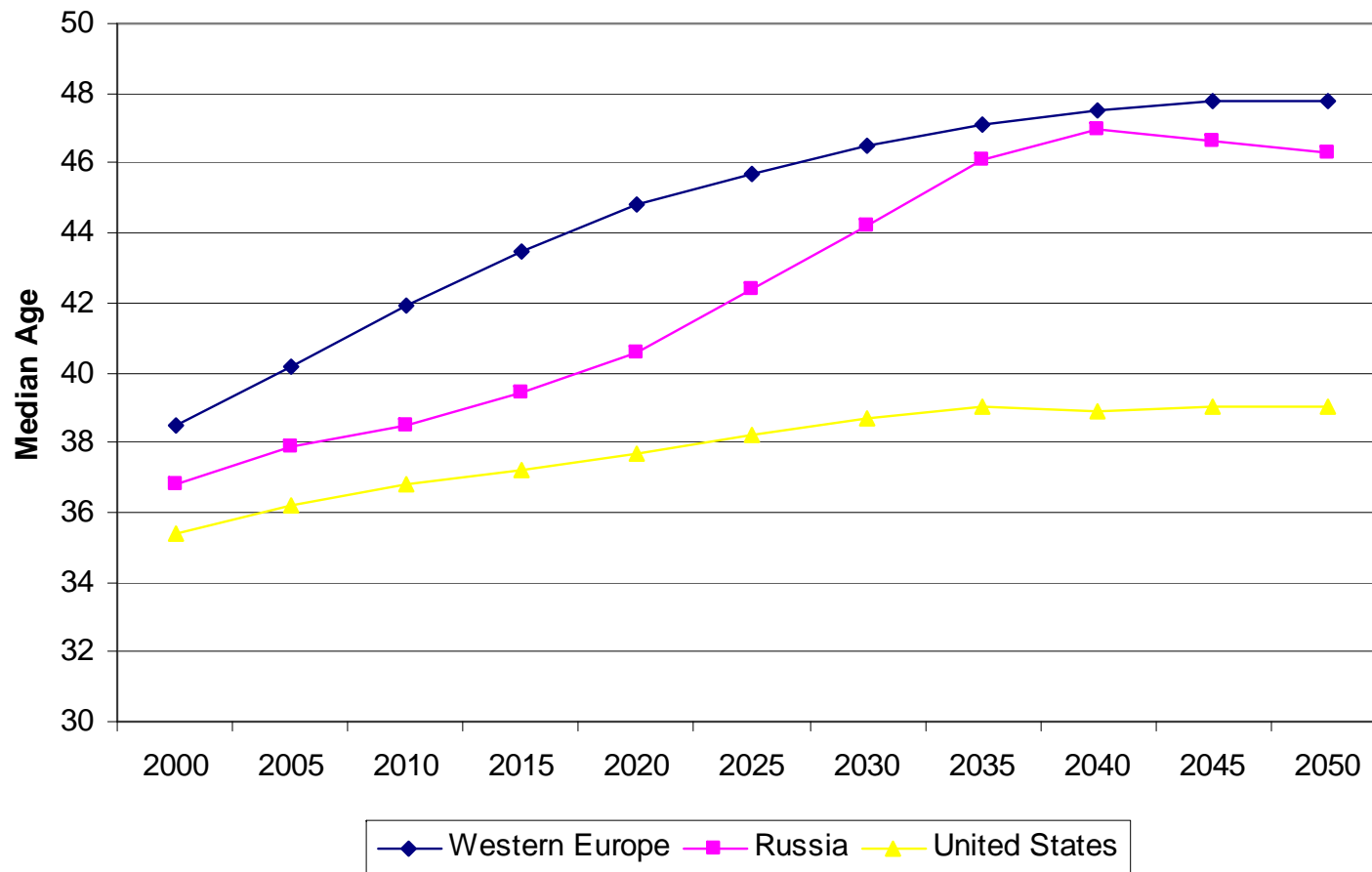
# Total Fertility Rates, Europe vs. “Anglo” USA: 2000



Note: « Anglo » = non-Hispanic White. « Period » total fertility rates in 2000 presented for European countries and for the 50 American federal states. « EU » is pre-accession.

Sources: Institut National d'etudes demographiques, "Population en chiffres," <http://www.ined.fr/population-en-chiffres/pays-developpes/index.html>, accessed 8/4/04; National Vital Statistics Report: Vol 52, No. 19 May 10, 2004.

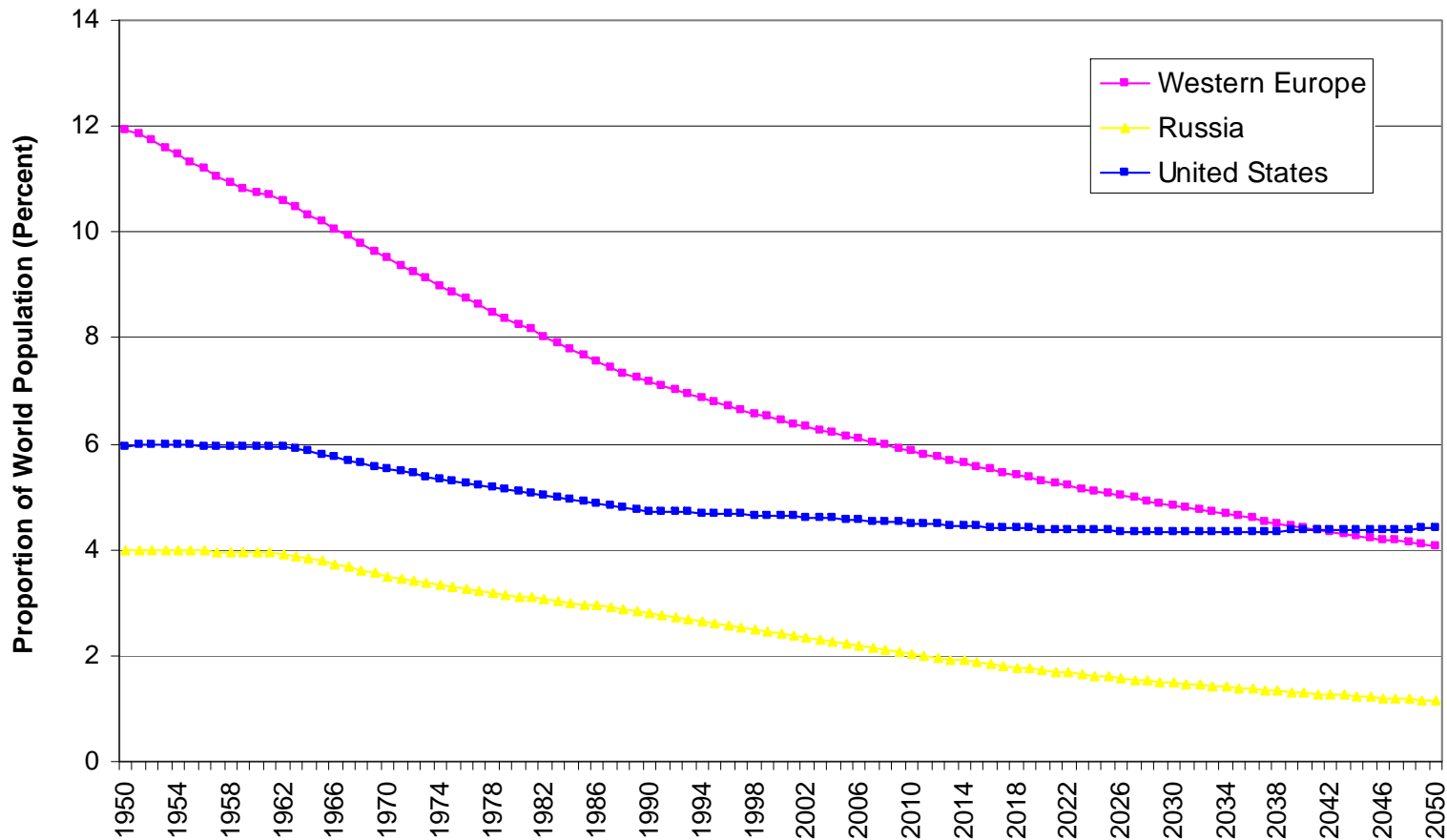
# Projected Median Ages: Western Europe, Russia, and the United States, 2000-2050



Note: "Western Europe" as defined by unofficial US Census Bureau taxonomy.

Source: U.S. Census Bureau, International Data Base, <http://www.census.gov/ipc/www/idbagg.html>, accessed March 23, 2009.

# Estimated and Projected Proportion of World Population: United States, Western Europe and Russia: 1950-2050 (projected)



Source: US Census Bureau, International Data Base, <http://www.census.gov/cgi-bin/ipc/aggggen.html>, accessed 10/30/2008.