



## Economic Implications of Demographic Change: Diversity Dividend or Deficit?

MARTA TIENDA\*

*The economic implications of demographic change depend on steadfast investments in research and development; replenishment of the human capital stock diminished by retiring Baby Boomers; and raising college attainment rates. This way the United States can leverage its diverse, fast-growing population to harness a demographic dividend—the productivity boost enabled by declining fertility—while also fueling economic growth, restocking the Social Security system, and bolstering global competitiveness.*

*Business Economics* (2016) 51, 11–17.

doi:10.1057/be.2016.1

**Keywords:** *demographic dividend, population diversification, generational transition, human capital stock*

During the first half of the twentieth century, the U.S. racial landscape was defined by the Black-White color line. In 1900, 88 percent of the nation's 76 million residents were White, 11 percent were Black; less than 1 percent were “other races”—Native Americans or other nonwhites. Even as the U.S. population doubled to 150 million, the racial composition remained relatively stable; however, beginning in the 1960s and with greater momentum after 1970, population diversification gained momentum owing both to changes in immigration policy and to higher fertility of ethnic and foreign-born women.

### 1. The Record of U.S. Demographic Diversification

Table 1 summarizes the U.S. diversification narrative over the past century as the population quadrupled to

**Table 1. U.S. Population Composition, 1900–2010 (Percentages)**

	1900	1950	1970	1980	1990	2000	2010
White	88	89	83	80	76	71	62
Black	11	10	11	11	11	12	13
Hispanic	0	0	4	6	9	12	16
Asian	0	0	1	2	3	4	5
Other	1	1	1	1	1	1	4
U.S. population (millions)	76	250	205	227	249	282	310

Source: U.S. Census Bureau [1901–1992] & Humes et al [2011].

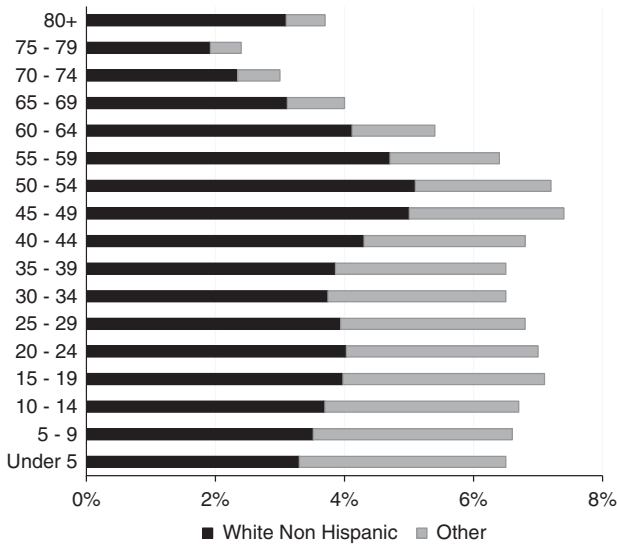
310 million. The White population share declined from 89 percent in the middle of the twentieth century to about 71 percent in 2000 and 62 percent by 2010. The Black population share, which remained rather stable throughout the twentieth century at 11–12 percent of the total, inched up to 13 percent in 2010. In contrast, the Hispanic and Asian populations have surged since 1970, largely due to the resurgence of mass migration after the 1965 Amendments to the Immigration and Nationality Act lifted restrictions on immigration from Asia and made family reunification the centerpiece of the admission regime.<sup>1</sup> Unlike the Asian population

<sup>1</sup>Although the Hispanic presence in North America predates the establishment of the United States as a sovereign nation, until 1970 the U.S. Census Bureau did not use a consistent question to identify Hispanics. Rather, surnames were used in the Southwest to identify Mexicans; Puerto Ricans were enumerated in the

Based on a presentation in the NBER Panel on Economic Implications of Demographic Change at the NABE Annual Meeting, October 11, 2015.

\*Marta Tienda is Maurice P. During '22 Professor of Demographic Studies and Professor of Sociology and Public Affairs at Princeton University and past president of the Population Association of America. She is a member of the American Academy of Arts and Sciences, the American Academy of Political and Social Sciences, and the National Academy of Education. Currently Dr. Tienda serves as an independent trustee of the Teachers Insurance Annuity Association (TIAA), the Alfred P. Sloan Foundation, and the Jacobs Foundation of Switzerland. She is a member of the White House Commission on Educational Excellence for Hispanics, the Research Advisory Committee of the American Education Research Association and the Board of Population Reference Bureau. Previously she served on the boards of Brown University, the Federal Reserve Bank of New York, the W.T. Grant Foundation, the Carnegie Corporation of New York, the Kaiser Family Foundation, and the Russell Sage Foundation. Dr. Tienda received a B.A. from Michigan State University (Spanish, 1972) and a Ph.D. in sociology from the University of Texas at Austin (1976).

Figure 1. U.S. Age Structure by Race, 2010



Source: Census 2010, Census Bureau; Social Explorer Tables SE:T12 and SE:T41.

share, which has risen gradually even as the total population has increased, the Hispanic population has more than trebled over the last 50 years, rising from about 4.5 percent in 1970 to more than 16 percent by 2010. Put differently, Latinos represented 36 percent of the net 100 million persons added to the U.S. population between 1966 and 2006—more than Whites (34 percent), and more than Blacks (16 percent) and Asians (13 percent) combined [Pew Hispanic Center 2006]. The relative growth of the Hispanic population is projected to continue for the foreseeable future, albeit at a slower rate [Frey 2015]

The economic significance of the unprecedented population diversification partly derives from the accompanying and equally profound, generational transition characterized by an aging White majority and a youthful minority population. Figure 1 illustrates the ethno-racial contours of the changing age structure. Thanks to the baby boom—a period of above-replacement fertility between 1946 and 1964—in 1970 over one-in-three U.S. residents was under age 18 and less than 10 percent was ages 65 and over; by 2010, the youth share had dropped to less than one-in-four; and, as the outsized Baby Boom cohorts approached retirement, the senior share rose to 13 percent [Howden and Meyer 2011]. These changes have important implications for old-age support burdens, the solvency of the Social Security system, and the nation’s ability to compete in a globalized economy.

Northeast; and Cubans were identified in Florida if they were foreign born. See Tienda and Mitchell [2006] for further details.

Table 2. Ethno-Racial Composition of U.S. Total and College-Educated Population, 2010 (Percentages)

	Total Population	Bachelor’s Degree	Ph.D.
White	62.3	72.9	74.3
Hispanic	16.3	8.8	5.8
Black	12.6	10.3	7.4
Asian	5.0	7.3	11.8
Other	3.8	0.8	0.7

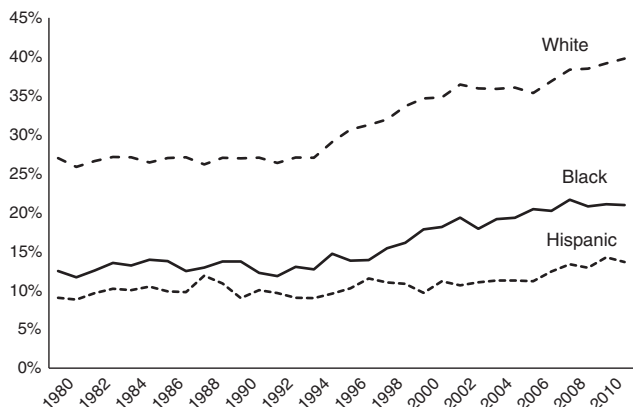
Source: Humes et al [2011] and Aud et al. [2012].

## 2. Demographic Diversity and Public Policy

Demography is not destiny; rather, demographic destinies are shaped by social policies, most notably investments that can increase the quality and stock of human capital. By replenishing the labor force with new workers, population growth can drive economic growth both by facilitating economies of scale and building the stock of useful knowledge via investments in education. That today international competitiveness depends more on the *quality* of labor than the sheer quantity underscores the importance of investments in the rapidly growing school-age population—disproportionately minority—that will replace the aging boomers and maintain U.S. productivity as global competition rises. As I illustrate below, not only is United States losing ground in its human capital stock compared with its industrialized peers, but educational inequality also is rising because the fast-growing Hispanic population is falling behind in educational attainment. Combined with slowing population growth, these developments will undermine the economic potential of recent demographic trends.

To illustrate the dimensions of educational inequality, Table 2 summarizes the ethno-racial composition of college-educated adults in 2010. Even without taking into account differences in the age composition of the minority and White populations, a comparison of the college-educated and the total population reveals several noteworthy differences. Among recipients of bachelor’s (B.A., B.S., B.F.A) and doctoral degrees, nearly three out of four are White. The fast-growing Hispanic population held less than 10 percent of all bachelors’ degrees and about six percent of all Ph.D.s in 2010. Asians, by contrast, are over-represented among the ranks of baccalaureate and advanced degree recipients. Although Asians comprised about 5 percent of the total population, they account for nearly 12 percent of the population with Ph.D.s. To some

Figure 2. BA Attainment Rates for 25–34-Year-Olds, 1980–2011 (Percentages)



Source: Demos [2011].

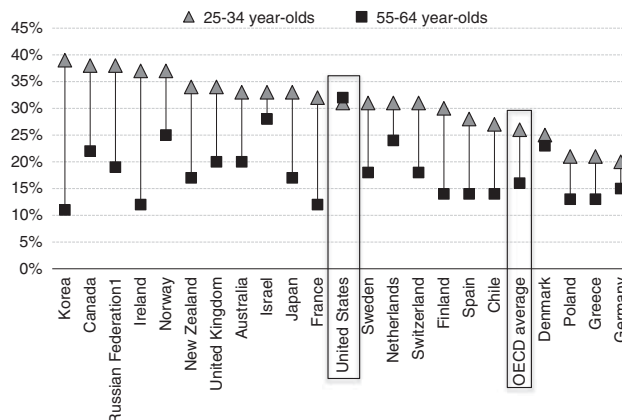
extent the Asian advantage results from U.S. immigration preferences for highly skilled workers, but the higher college attendance and completion rates among the children of Asian immigrants also contribute to the observed lead.

For a temporal perspective of racial and ethnic differences in post-secondary education, Figure 2 presents college attainment rates for Black, White, and Hispanic 25–34-year-olds. Focusing on the age by which schooling investments are largely completed permits uniform comparisons among groups with unequal age structures, such as Hispanics and Whites. The upward sloping curves indicate that college attainment rates have been rising for all groups, which is decidedly good news. That the White slope is steeper implies that the college attainment gaps between Whites and Hispanics and between Whites and Blacks have widened—bad news in light of the diversification narrative under way since the 1970s. The Black/White attainment gap rose 5 percentage points (from 14 to 19 percentage points) between 1980 and 2010; the Hispanic/White gap rose 8 percentage points (from 18 to 26 percentage points) over the same period. It bears emphasizing that Hispanics—the youngest and fastest growing demographic group—is trailing the slowest growing group (Whites) in educational attainment. That Hispanics are coming of age in an aging society does not bode well for preserving the nation’s economic competitiveness or assuming the support burden for the aging White boomer cohorts.

### 3. U.S. Human Capital in an International Context

For several decades the United States stood apart from its industrialized peers as the most highly educated nation, but this status is at risk because educational

Figure 3. Population Ages 25–34 with a Bachelor’s Degree or Higher, 2010 (Percentages)



Source: OECD 2012. Table A1.3a. ([www.oecd.org/edu/eag2012](http://www.oecd.org/edu/eag2012)).

investments have not kept pace with the population growth or with human capital investments made by our competitors. Figure 3 illustrates the dimensions of the problem by comparing the shares of college-educated 25- to 34-year-olds in 2010 with the 55- to 64-year-olds—the outsized Baby Boomer cohorts—that were ages 25- to 34-year old in 1980. The most striking feature is the stagnation in the college-educated population share for the United States. This outcome contrasts sharply with most of our industrialized peers, whose human capital stock among 25- to 34-year-olds now parallels (for example, the United Kingdom and Japan) or exceeds (for example, South Korea, Canada and Russia) that of the United States. This is a worrisome development because history shows that the rise in educational attainment drove American economic growth during the late nineteenth and through most of the twentieth century; however, since 1990, gains in educational attainment appear to have slowed [Gordon 2013].

Korea’s example is particularly noteworthy because the dramatic increase in the nation’s human capital stock occurred in the aftermath of economic devastation following the civil war. Demographers have attributed South Korea’s “economic miracle” to well-timed policy changes that include massive investments in reproductive health and education programs coupled with investments in infrastructure and manufacturing [Gribble 2012]. The population policies resulted in a precipitous decline in fertility, which, in turn, generated a window of opportunity for economic growth by sharply curtailing the youth dependency burden. Korea’s leaders seized the opportunity to achieve a productivity boost by increasing human capital investments in shrinking birth cohorts, thereby

setting in motion a process to upgrade the quality of the labor force in the future. Initially, educational investments focused on training and skills geared to support the export-oriented production economy but also higher education. Figure 2 shows an impressive intercohort gain in baccalaureate degree attainment in Korea, from 11 percent among the 55- to 64-year-olds to 39 percent among 25- to 34-year-olds, surpassing the comparable U.S. age cohort at 31 percent. Canada and Russia, two formidable international competitors, appreciably improved their intercohort B.A. attainment rates and surpassed the United States on this important metric by 2010.

#### 4. The Opportunity for a Demographic Dividend

The relative decline of U.S. human capital need not persist. With adequate social policies, the United States can leverage its diverse, fast-growing population to harness a demographic dividend, namely a productivity boost enabled by declining fertility, provided that requisite educational investments are made in the shrinking youth cohorts. The challenge faced by the United States is not motivating fertility decline—that process is already well under way even among groups with above replacement fertility, like Hispanics. Rather, the challenge is closing college attainment gaps among the fast-growing minority youth cohorts so that they are equipped to replenish the human capital stock amassed by the U.S. Baby Boomers. Moreover, this imperative must be achieved with all deliberate speed because the outsized Boomer generation has already begun to retire. The burgeoning population of seniors will require highly productive replenishment workers who can generate Social Security benefits for the swelling ranks of retirees and rekindle technological innovation and spur economic growth to the century-long average of 2 percent [Gordon 2013].

It bears emphasizing that the demographic dividend is not automatic; that harnessing a productivity boost in the context of declining fertility requires serious educational investments, and that the United States has traveled this road in the past. In 1950, when the U.S. population reached 250 million, only 5 percent attained a baccalaureate or advanced degree. This changed after World War II, thanks in part to the democratization of higher education facilitated by the G.I. Bill. Undergraduate enrollment doubled between 1950 and 1961 as large numbers of veterans completed college degrees. Then the Russians launched Sputnik, which signaled a Russian advantage in the Cold War. In response, the federal government consolidated spending on Research and Development;

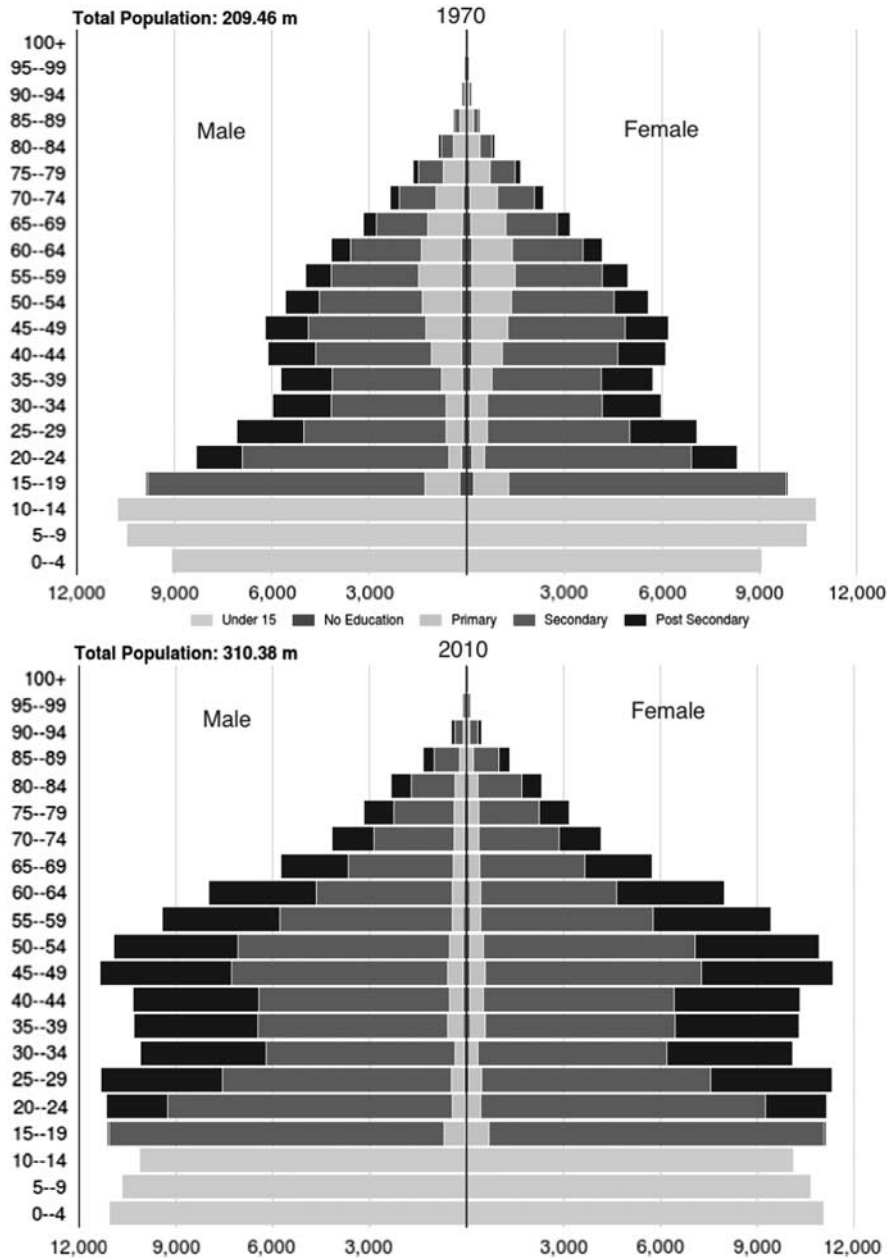
created the National Science Foundation; and invested enormous resources in the expansion of public higher education. Federal tuition grants also permitted low-income students (like me) to attend college with little to no debt upon completion. Education expenditures as a percentage of GDP rose during the Cold War through the mid-1970s [U.S. Department of Health, Education and Welfare 1976].

In 1970, only 11 percent of the U.S. population had completed a bachelor's degree or more. The top panel of Figure 4 shows that the oversized Baby Boom cohorts embraced the U.S. educational system. Also evident in the lowest bar is the start of the fertility decline. The post-Boom fertility decline offered a propitious opportunity to harness a demographic dividend via human capital investments, and federal policy seized the moment to do so. The lower panel of Figure 4 reveals the fruits of the nation's investment in R&D, expansion of higher education, and broadened access facilitated by the G.I. Bill and income-tested tuition grants, such as the Pell Grant. By 2010 approximately 30 percent of the U.S. population ages 25 and over had attained a baccalaureate degree or higher. The 2010 age-education pyramid also indicates not only *which* age cohorts benefitted from expanded college opportunities, but also that further declines in fertility are now under way.

To the detriment of the nation, federal commitment to education waned in the aftermath of the 1973 Oil Crisis, the Vietnam War, and the sharp budget cuts witnessed during the 1980s. Federal outlays for education remained below 5 percent of GDP from 1986 to 1999, even as the youth population continued to grow, and have fluctuated between 5 and 5.5 percent of GDP since 2001 [UNESCO 2015]. The Great Recession has further undermined educational progress; as of 2014, many states had still not achieved prerecession investments in education. Public policies that balance state budgets on the shoulders of young people by cutting and deferring educational investments not only are misguided, but also will compromise the future of the nation.

U.S. expenditures on research and development (R&D) as a percentage of GDP also have been relatively flat since the end of the Cold War, despite the ascent of China as an economic powerhouse, as Figure 5 shows. However, Korea has not been complacent about getting and maintaining a competitive edge in the international arena: R&D investment rates in South Korea surpassed those of the United States after 2002. Both Japan and Israel invest in research and development at higher rates than the United States, which maintains its economic advantage over all three nations through scale. The end

Figure 4. U.S. Age-Education Pyramids, 1970 and 2010



Source: Lutz et al. [2014].

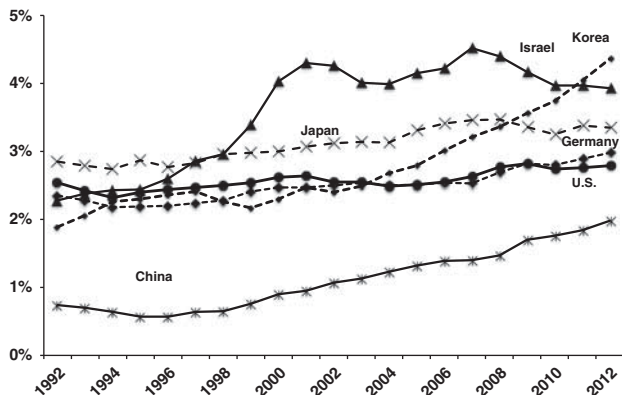
of the Cold War appears to have infused developed countries' leaders with complacency on the R&D front, and ending this complacency is a necessary condition to re-energize technological innovation and capitalize on educational investments. In no small way, then, the economic implications of demographic change will depend crucially on future investments in R&D, a steadfast commitment to restoring the stock of human capital diminished by the retiring Baby Boomers, and progress in closing the college attainment gaps between

Whites and Asians on the one hand, and Hispanics and Blacks on the other.

## 5. The Path Forward

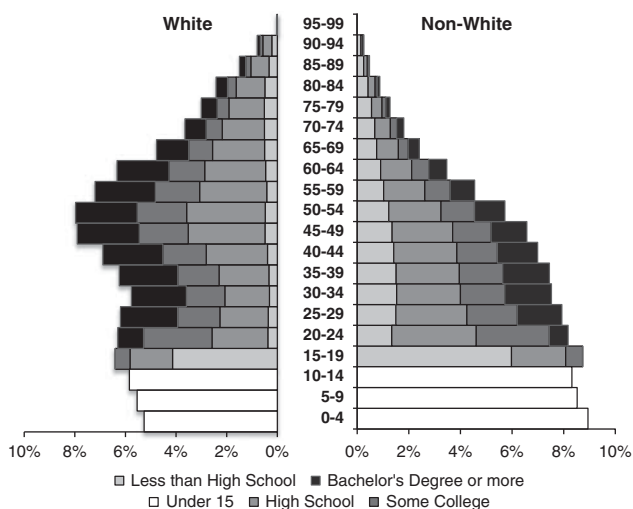
Demographic diversification is not a transitory feature of the U.S. population, but whether it is a risk or an opportunity for economic growth remains highly uncertain. For the first time in history, in 2015, the majority of K-12 students were nonwhite [NCES

Figure 5. R&D Expenditures as a Percentage of GDP, 1992–2012: Selected OECD Nations and China



Source: OECD.Stat [2015].

Figure 6. 2010 U.S. Age-Education Pyramids: White and Non-White Populations (Percentages)



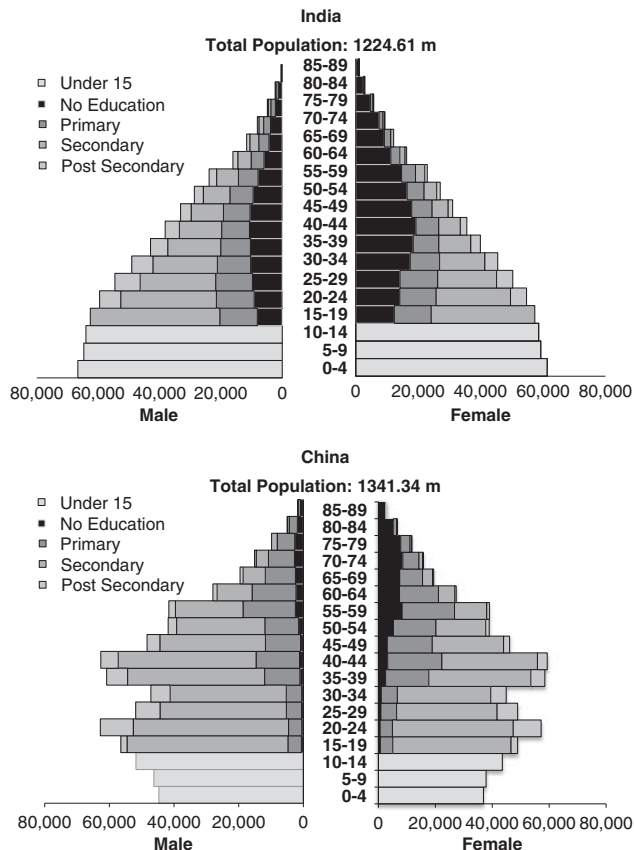
Source: Ruggles et al. [2010].

Note: The White population is 201.6 million and the non-White population is 108.6 million.

2014]. But what does this mean? To a large extent the answer depends on successes in raising college attainment rates among young people of color. The changing demography of the school-age population is an opportunity to harness a demographic dividend in the face of dropping minority fertility; this outcome is not assured because minority youth are coming of age in an aging White society, a period of stagnant social mobility, and political polarization.

Figure 6 summarizes the dimensions of the challenge and opportunity ahead. The left side of the age-education pyramid is for the White population, which totaled about 202 million; the right side represents the nonwhite population—Blacks, Hispanics, Asians, and

Figure 7. 2010 Age-Education Pyramids: India and China



Source: Lutz et al. [2014].

others—that numbered nearly 109 million in 2010. The lower bars show the impact of below replacement fertility among Whites that results in shrinking cohorts, which contrasts with the wider bars for the minority population. Also evident is the imprint of the expansion of postsecondary educational system that enabled the demographic dividend as the Baby Boom cohorts attained college degrees at high rates, but will need to be replenished as growing numbers retire. The looming question is whether the human capital stock of the swelling nonwhite youth population will be sufficient to meet the support demands of the aging White majority as the generational transition continues to unwind.

Whether demography represents a risk for the nation or an opportunity to re-ignite economic growth depends very much on our education policy. I have argued that leveraging diversity by raising college attainment is important to replenish the highly educated Boomer generations. A productive workforce can also contribute to the solvency of the Social Security system. A third reason is to ensure that the nation is

well positioned to compete with the two “demographic billionaires”—China and India. Figure 7 shows the age-education pyramids for China and India. Although both nations have over one billion people, their age structures are notably different.

Thanks to the one-child policy, China is aging rapidly, and its labor force has begun to shrink. In addition to driving the total fertility rate below replacement (estimated at 1.7 as of 2012), the one-child policy, which was recently overturned, has left an indelible imprint on the age structure. Investments in primary and secondary schooling virtually eliminated illiteracy among working-age men and most working-age women and there has been a steady growth in the college-educated population, which is clearly evident for the 20- to 24-age group. China mostly derived its economic momentum through scale—its enormous workforce, but this may change as leaders continue in their push to compete via quality rather than sheer quantity.

India’s birthrate, although falling, remains above replacement at 2.5 births per woman, on average. India has been a source of high-skill labor both through immigration and via outsourcing of high-tech services for the United States and for other immigrant-receiving nations. With a population nearly four times the size of the United States, India could help replenish the loss of human capital as the Baby Boomers retire, but that would only foment racial and ethnic inequality by postponing the need to close college attainment gaps. Moreover, there is consensus in the demographic community that immigration can only attenuate, not stop, population aging. A renewed commitment to investments in education at levels comparable to those attained during the Cold War will go a long way to replenishing the nation’s human capital stock by capitalizing on diversity and coping with population aging.

### Acknowledgements

I would like to thank Cara Carpenito for her technical support in preparing the presentation and the manuscript.

### REFERENCES

- Aud, S., W. Hussar, F. Johnson, G. Kena, E. Roth, E. Manning, X. Wang and J. Zhang. 2012. *The Condition of Education 2012*. Washington D.C.: U.S. Department of Education, National Center for Statistics).
- Demos, 2011. *The State of Young America: The Databook*. Demos and The Young Invincibles. <http://www.demos.org/state-of-young-america> (accessed October 23, 2014).
- Frey, William H. 2015. *Diversity Explosion: How New Racial Demographics are Remaking America*. Brookings Institution Press.
- Gordon, Robert J. 2013. “The Great Stagnation of American Education.” *New York Times*, Opinion Pages (September 7).
- Gribble, James N. 2012. “South Korea’s Demographic Dividend.” *Population Reference Bureau*, <http://www.prb.org/Publications/Articles/2012/south-korea-population.aspx> (accessed July 30, 2014).
- Howden, Lindsay M., and Julie A. Meyer. 2011. *Age and Sex Composition: 2010*. U.S. Department of Commerce Economics and Statistics Administration, U.S. Census Bureau.
- Humes, Karen R., Nicholas A. Jones and Roberto R. Ramirez. 2011. *Overview of Race and Hispanic Origin: 2010*. U.S. Census Bureau.
- Lutz, Wolfgang, William P. Butz and Samir K.C. 2014. *World Population & Human Capital in the Twenty-first Century*. Oxford: Oxford University Press.
- National Center for Education Statistics (NCES), 2014. Actual and Projected Numbers for Enrollment in Public Elementary and Secondary Schools, by Race/Ethnicity: Fall 1997 through Fall 2022. *Projections of Education Statistics to 2022, Table 3* (41st Edition).
- OECD, 2012. *Education at a Glance 2012: OECD Indicators*. OECD Publishing, <http://www.oecd.org/edu/eag2012.htm> (accessed October 23, 2014).
- OECD.Stat, 2015. *GERD as a Percentage of GDP*. OECD Publishing, [http://stats.oecd.org/Index.aspx?DataSetCode=MSTI\\_PUB](http://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB).
- Pew Hispanic Center, 2006. *From 200 Million to 300 Million: The Numbers Behind Population Growth*. Pew Hispanic Center.
- Social Explorer, 2010. *Data Dictionary: Census 2010*. Social Explorer.
- Marta Tienda and Faith Mitchell edited by. 2006. *Multiple Origins, Uncertain Destinies: Hispanics and the American Future*. National Academy Press.
- U.S. Census Bureau, 1901. *Census of the United States, 1900*. Department of the Interior.
- , 1953. *Census of the United States, 1950*. U.S. Census Bureau).
- , 1973. *Census of the United States, 1970*. U.S. Department of Commerce, Bureau of the Census.
- , 1992. *1990 Census of Population, General Population Characteristics, United States*. U.S. Department of Commerce, Bureau of the Census.
- Ruggles, S., Katie Genadek, Ronald Goeken, Josiah Grover and Matthew Sobek. 2010. Educational Attainment – 2010 American Community Survey 1 Year Estimates. *Integrated Public Use Microdata Series: Version 6.0* [Machine-readable database]. Minneapolis: University of Minnesota.
- UNESCO Institute for Statistics, 2015. Expenditure on Education as % of GDP (from government sources). UNESCO <http://data.uis.unesco.org/?queryid=181> (accessed March 25, 2015).
- U.S. Department of Health, Education, and Welfare, 1976. *Annual Report of the Commissioner of Education Fiscal Year 1975*. Washington DC: U.S. GPO.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.