

## ***The Problem of Puerto Rico: Results from the 2010 Census and the Late Demographic Transition***

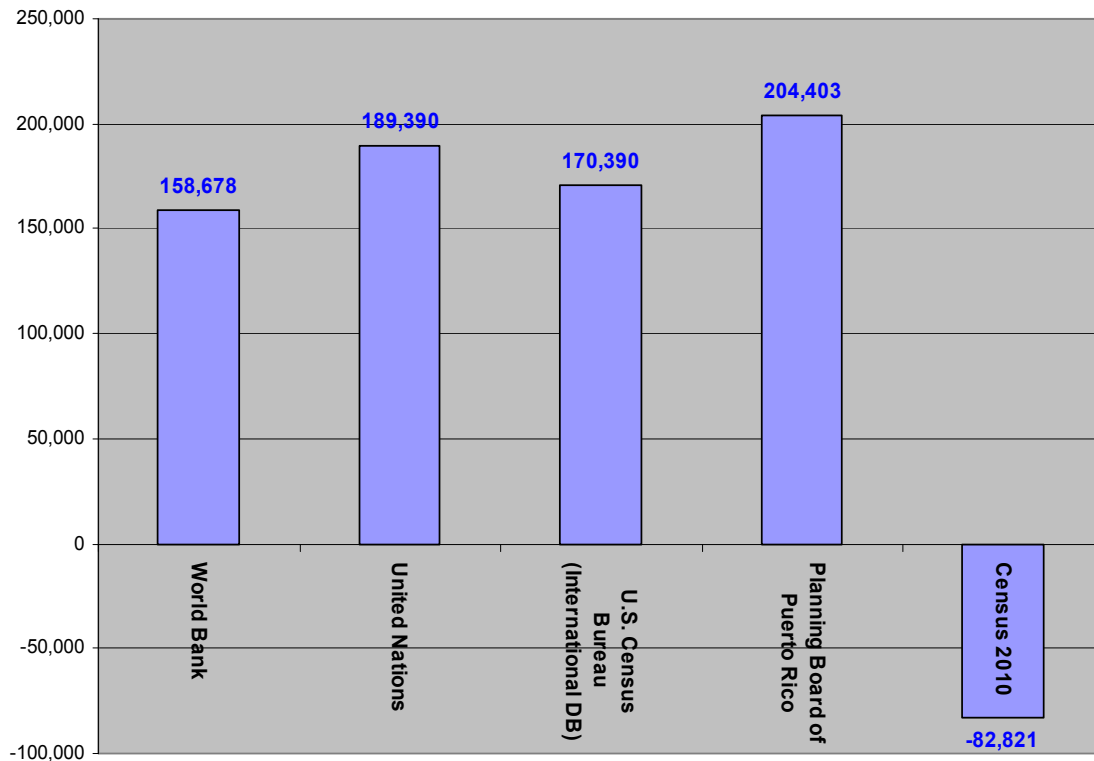
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### **Overview**

The 2010 Census provides an important benchmark for demographic estimation, in addition to providing new understanding to the underlying causes of demographic shifts in the United States. In some cases, the decennial census reveals unexpected shifts that previous estimation efforts did not accurately capture. One such case is Puerto Rico – along with Michigan, Puerto Rico was revealed to be the only other state-equivalent area to demonstrate a population decline since the 2000 Census. However, the case of Puerto Rico is empirically distinct insofar that most population estimates projected a net decline for the state of Michigan in recent years, whereas most major population benchmarks (domestic and international) estimated population growth over the decade for Puerto Rico.

**Total Population Change from Census 2000 to 2010 for Puerto Rico  
Population Estimates for 2010 and Census 2010 Results**



Thus, Puerto Rico presents a unique case where intercensal population estimates were misaligned both in directionality and magnitude. Though data and measurement in Puerto Rico is

similar to other state-equivalent areas, including coverage in the American Community Survey program and regular population estimates from the U.S. Census Bureau Population Division, “the problem of Puerto Rico” demonstrates where standard population estimation assumptions may require recalibration or necessitate careful consideration of population factors unique to areas such as Puerto Rico.

The objectives of this paper are threefold: first, we examine Census 2010 results for Puerto Rico to examine where previous estimations (including results from the Puerto Rico Community Survey) differ. Based on this analysis, we then note where these results indicate a distinct “modern” demographic transition for the island of Puerto Rico. We conclude with implications for ongoing measurement of Puerto Rico and demonstration of techniques prior to the 2010 Census which yielded estimates with improved accuracy despite flaws in the extant data.

## **Background**

The Nielsen Company measures consumer behavior in over 80 countries across the globe, including the national and local television ratings in the United States. Television ratings mitigate upwards of \$70 billion in advertising revenue annually. A crucial technical component of this production are the Universe Estimates (UEs), a series of national and local demographic estimates for television households and persons therein used as controls for the Nielsen sample and are a large component of ratings calculations.

While the Nielsen Company has operated a television service in the U.S. since 1936, until very recently measurement in the United States only included the 50 states<sup>1</sup> and the District of Columbia. In 2010 television coverage by Nielsen was extended to Puerto Rico. One of the most fundamental challenges for this measurement was estimating populations and households for panel selection and weighting.

A combination of sources from the U.S. Census Bureau (notably, the Puerto Rico Community Survey and population estimates from the U.S. Census Bureau Population Division) in addition to local household and population estimates from the *Junta De Planificacion de Puerto Rico* (Planning Board of Puerto Rico) were utilized for the creation of the initial Universe Estimates. However, because all sources estimated a stable population increase since the 2000 Census, the resulting UEs were found to be higher than results from the 2010 Census<sup>2</sup>. As such, the cause

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<sup>1</sup> Some portions of northern Alaska are not included due to insufficient financial support for TV measurement

<sup>2</sup> Household estimation was more successful, a point which will be discussed in the presented paper.

and composition of these shifts have become paramount to understanding the demographic future of Puerto Rico to facilitate ongoing (and accurate) population and household estimates.

### Immigration and Transitions

While detailed results from the 2010 Census (via the Summary File 1) has only recently become available, initial results indicate a fundamental shift in the age structure of Puerto Rico when comparing 2010 Census results of the 2009 Vintage U.S. Census Bureau Population estimates for Puerto Rico. Specifically, while almost all age categories declined, population differentials were predominately younger, particularly for persons 20-29 and 30-39.

	2009 Census Pop Est.	2010 Census SF1	2010 vs. 2009 (Est.)
0-9	494,117	464,760	-5.94%
10-19	589,190	552,830	-6.17%
20-29	556,761	505,009	-9.30%
30-39	540,177	489,443	-9.39%
40-49	526,574	490,244	-6.90%
50-59	480,359	463,428	-3.52%
60-69	395,906	393,488	-0.61%
70+	384,204	366,587	-4.59%
Total	3,967,288	3,725,789	-6.09%

Because of the disproportionately large decline in younger ages likely to be in the labor force, these differentials in the age structure seem to strongly indicate a heightened level of domestic immigration of younger persons from the island of Puerto Rico to the states. Recent research from Pew (Lopez and Velasco 2011) indicates that more Puerto Ricans live in the U.S than the island of Puerto Rico, and ACS 2009 results indicate that these populations differ along lines of education, income, and marital status among other characteristics. Thus, on the one hand, the unexpected decline in population in Puerto Rico could be attributed to larger than expected immigration from Puerto Rico the U.S. which (like all domestic migration) is less rigorously captured by official statistics than international migration.

On the other hand, overall population declines (and an age structure which is more top-loaded than previously estimated) may be demonstrative of the later-stages of the demographic transition already well underway in Puerto Rico. In other words, Puerto Rico, along with countries

such as Germany, Italy, Japan, and Russia, has reached a threshold in urbanization where fertility sags, mortality declines thus increasing the proportion of older populations, and overall population declines lacking intervention from forces such as immigration<sup>3</sup>. Recently, Bloomberg news (Wong 2010) included Puerto Rico in its list of “The World’s Fastest Shrinking Countries” citing data from the Population Reference Bureau which indicates low fertility rates (1.6) and an overall negative net migration rate (-1) which is attributed to people leaving the island for work despite minor improvements to the local economy. Thus, while the U.S. (arguably, or at least not to the extent many European countries have) has not yet reached the final stages of the demographic transition largely in part to continued immigration, it may be the case that the U.S. has a late-transition territory in its own (figurative) back yard.

### **The Demographic Future of Puerto Rico**

Guided in part by this theoretical framework, this paper draws upon data from the latest results of the American Community Survey and new data from the 2010 Census to examine shifts in the composition and size of the Puerto Rican population both in the U.S. and inhabiting the island. Results will inform considerations for future population estimates consistent with the 2010 Census, and provide guidance on factors of importance in considering the demographic future of Puerto Rico. We close this analysis commenting on implications and demonstrating techniques which yielded improved accuracy in demographic estimates of Puerto Rico despite limitations in pre-census data.

### **Abridged References**

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<sup>3</sup> See Kirk 1996 and Bogaats & Bulatao 1999, among others