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## Foreword

José Manuel Fernández\*

This special edition of the Hispanic Economic Outlook addresses the economic crisis present in Puerto Rico before and immediately after the landing of Hurricane Maria. Puerto Rico is a small island (100 miles by 35 miles) located in the Caribbean Sea. The United States acquired Puerto Rico as the result of the Spanish American War in 1898 and the island's inhabitants were granted U.S. citizenship by birthright with the Jones Act of 1917. Currently, the island is home to over 3 million U.S. citizens. Hurricane Maria, a powerful category 4 storm, made landfall in Puerto Rico on September 20, 2017. The aftermath of the storm left the entire island without power, with no form of formal communication, large scale flooding, and nearly 88,000 homes destroyed. Seven months after the hurricane nearly 100,000 people remain without power and tens of thousands lack running water.

The economic crisis (characterized as Puerto Rico's "Great Depression" and "La Crisis Boricua") plaguing the island predates Hurricane Maria. Puerto Rico's government defaulted on August 3, 2015 under the weight of a \$70 billion debt and unfunded pension obligations of \$50 billion. In this special issue, the lead article will discuss the causes of the economic crisis. The second article examines the effects of the 1920 Jones Act on both maritime commerce and the cost of living in Puerto Rico. The third article studies the decline in manufacturing following the repeal of IRS Section 936, which was a contributing factor to the economic crisis. Since 1976, Section 936 provided tax exemption to U.S. corporations from income originating from U.S. territories, but its repeal caused a large decrease in tax revenue and employment. The fourth article describes net migrant outflows from Puerto Rico to the mainland United States as a result of the economic crisis. In a report from the Center for Puerto Rican Studies at the City University of New York, Puerto Rico is estimated to lose about 14 percent of its population by 2019.<sup>1</sup> As in Luis Rafael Sanchez's movie *La Guagua Aérea*, which describes the flow of Puerto Ricans to New York during the 1970's, large numbers of Puerto Ricans are permanently leaving the island to settle in the U.S., many in Central Florida, as a result of the economic crisis and the slow recovery after the hurricane.

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<sup>1</sup> [https://centropr.hunter.cuny.edu/sites/default/files/RB2017-01-POST-MARIA%20EXODUS\\_V3.pdf](https://centropr.hunter.cuny.edu/sites/default/files/RB2017-01-POST-MARIA%20EXODUS_V3.pdf)

## The Exacerbating Effects of Hurricanes on Puerto Rico’s (Broken) Economy

Jose Caraballo-Cueto<sup>1</sup>

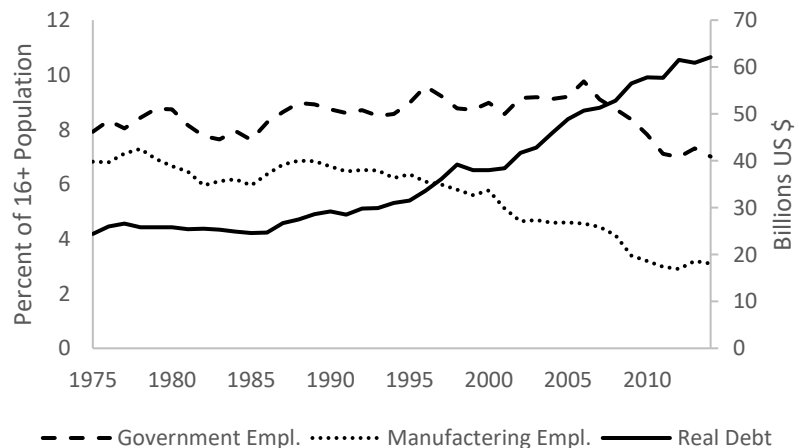
In 2005, a year before Puerto Rico’s Great Depression began, Economic Commission for Latin America and the Caribbean (ECLAC, 2005) states that one of the fundamental problems of Puerto Rico’s economy was job creation.<sup>2</sup> In 2006 Puerto Rico started its greatest depression in more than 100 years.<sup>3</sup> Real Gross National Income (GNI) in 2016 equaled the GNI of 1999 and public debt represented over 98% of the GNI. Close to 282,000 jobs were lost from 2006 to 2016. For the past 12 years, the real average wage remained static.

This economic situation existed on the island before two strong hurricanes struck in September, 2017. Hurricane Maria cost Puerto Rico more than \$55 billion.<sup>4</sup> In this note, we provided brief remarks on Puerto Rico’s overall socioeconomic conditions before and after Hurricane Maria. In section two we explained the fiscal crisis, in section three we introduce the situation in the labor market before and after the hurricanes, in section four we analyze the economic perspectives and in section five we close with some potential alternatives to the unfolding crises in Puerto Rico.

### The Unfolding of the Fiscal Crisis

In the context of its “fiscal autonomy,” bonds issued by the Puerto Rican government had a triple tax exemption: interest on such bonds is not taxed by the federal government, the Puerto Rico government, or municipal governments. This, and a generally good credit history, made Puerto Rico public bonds very attractive to municipal market investors over several decades.

Figure 1: Real Debt, Manufacturing, and Government Workforce, 1975-2014



Source: Caraballo and Lara (2016)

As economic growth slowed in the 1990s, the central government, many municipalities, and some of the larger state-owned corporations began to run current deficits. By 2005, the central government acknowledged the existence of a structural deficit approaching 2% of GNP, and debt rating agencies began to downgrade the government’s bonds.

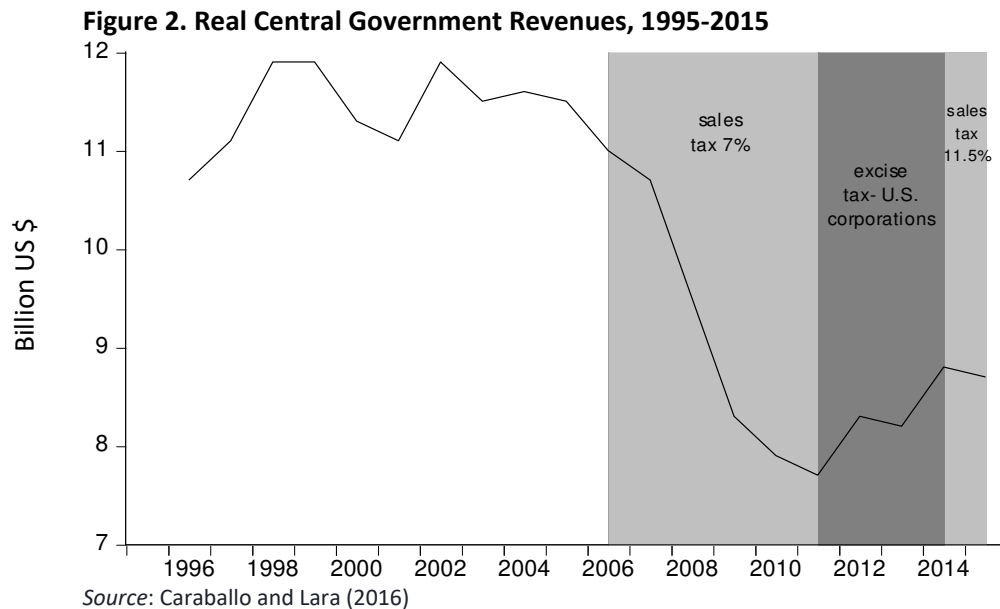
<sup>1</sup> Jose Caraballo-Cueto is an Assistant Professor at the University of Puerto Rico - Cayey. The author is grateful with Stephanie Rodriguez-Gali for her research assistance with some of the data presented in this note and to Ada Haiman for her helpful remarks. However, the usual disclaimer applies.

<sup>2</sup> <https://www.cepal.org/es/publicaciones/37894-globalizacion-desarrollo-desafios-puerto-rico-frente-al-siglo-xxi>

<sup>3</sup> Caraballo, José and Juan Lara (2016). *From Deindustrialization to Indebtedness: The Case of Puerto Rico*, RESEARCH GATE, <https://www.researchgate.net/publication/309736965>

<sup>4</sup> <https://coast.noaa.gov/states/fast-facts/hurricane-costs.html>

The decline in manufacturing employment is the main factor explaining the indebtedness of Puerto Rico, while the government workforce and federal transfers did not appear to bear a significant influence over real debt (for more details, see Caraballo and Lara, 2016). The removal of a federal tax incentive for U.S. manufacturing located in Puerto Rico ended in 2006. We can observe the enormous fall in government revenues afterwards in Figure 2, even when new tax measures were applied: a new sales tax of 7% in 2006 (that was increased to 11.5% in 2014) and a new excise tax on U.S. subsidiaries located in Puerto Rico.



Default came in June, 2015. Because assistance from the International Monetary Fund is not available for U.S. territories, most of Puerto Rico’s debt crisis will be processed within the U.S. financial and judicial systems, in a manner probably more akin to Detroit’s bankruptcy or to Argentina’s recent confrontation with creditors in U.S. courts over bonds sold in U.S. jurisdictions. As a backdrop to debt negotiations, the Puerto Rican government has drafted a five-year fiscal adjustment program in line with the recommendations of a special fiscal control board imposed by the U.S. Congress.

After the hurricanes, the general fund revenue increased by \$36.8 million in November, 6.9 percent, compared with November 2016. This apparent increase resulted from payments that month, of sales taxes withheld by many businesses in September and October, which could not be sent during those months due to the lack of electricity and internet connectivity. In September and October, the figures were \$289.2 million below revenue collections for the same months in the prior year.

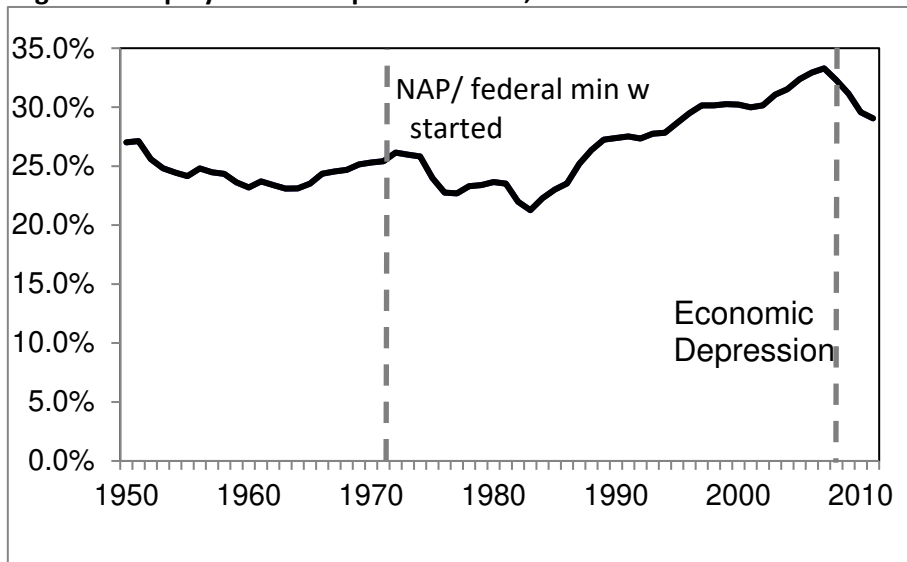
### Labor Market

Puerto Rico has historically suffered from relatively high structural unemployment, as stated by ECLAC (2005). According to the World Banks, the formal employment to population ratio averages 58.5% for the world, but in Puerto Rico it has never been greater than 35%, as shown in Figure 3.<sup>5</sup> Some observers

<sup>5</sup> <https://data.worldbank.org/indicator/SL.EMP.TOTL.SP.ZS>

hypothesize that federal programs applied in Puerto Rico in the middle of the 1970s caused such structural unemployment. However, in Figure 3 we can observe that, in general, employment was proportionally greater after the application of federal programs than in the heyday of industrialization, which weakens such a hypothesis.

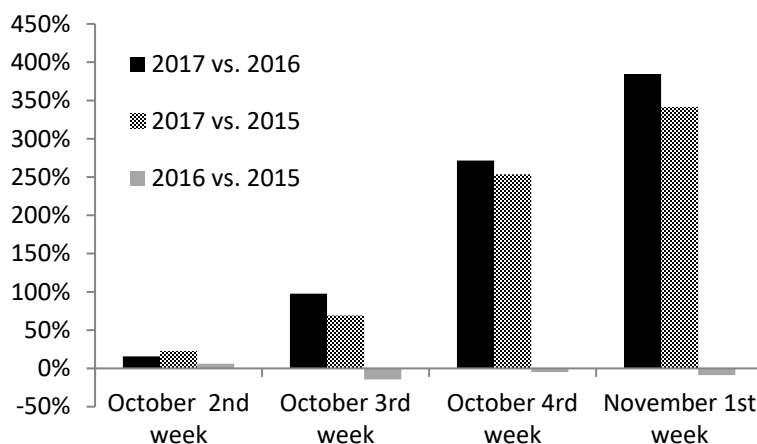
**Figure 3. Employment to Population Ratio, 1950-2011**



Source: Author's calculation on data from the Puerto Rico Planning Board

What happened after Maria? The accuracy of the labor force survey may have been affected by the condition of island's infrastructure in the aftermath of the hurricanes. Perhaps the more accurate barometer of the labor activity post-Maria is observed in the unemployment insurance claims because of its recording nature.

**Figure 4. Growth in unemployment insurance claims**



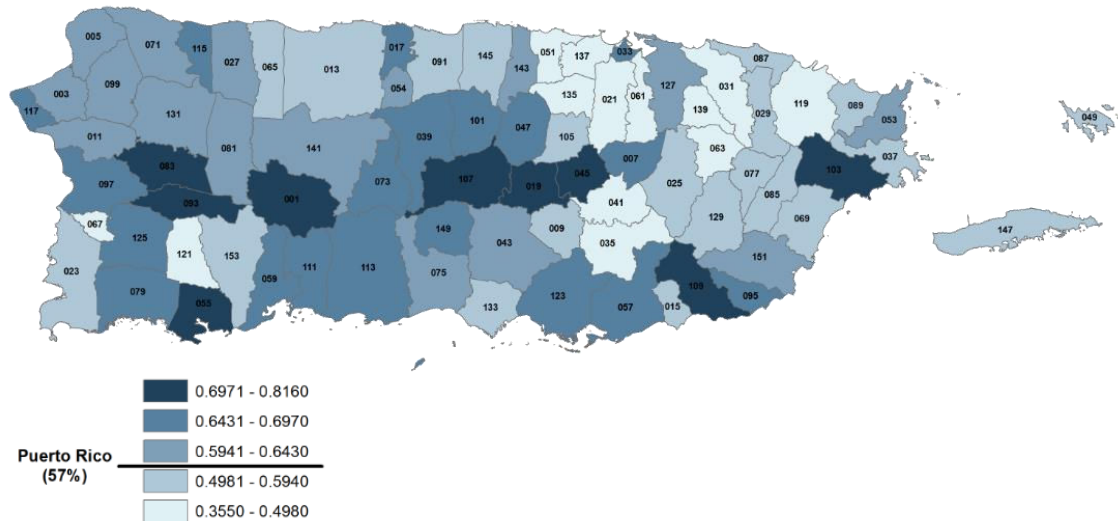
Source: OWA (2017)

As an example of Maria's effect, we noted that the percentage of claims for unemployment insurance for the first week of November was 385% higher than for the same week in 2016, as shown in Figure 4.

In terms of poverty, the rates increased from 44% in 2006 to 46% in 2015. But it is important to point out that if the 278,000 poor migrants of the period 2006-2014 would not have migrated, the poverty rate would have been 54% in 2014.

When data are disaggregated by age, children had the highest poverty rate at 58% in 2016. Figure 5, shows that poverty is not distributed evenly across the Island. The West, the South, and the Center of Puerto Rico appear to be the poorest area.

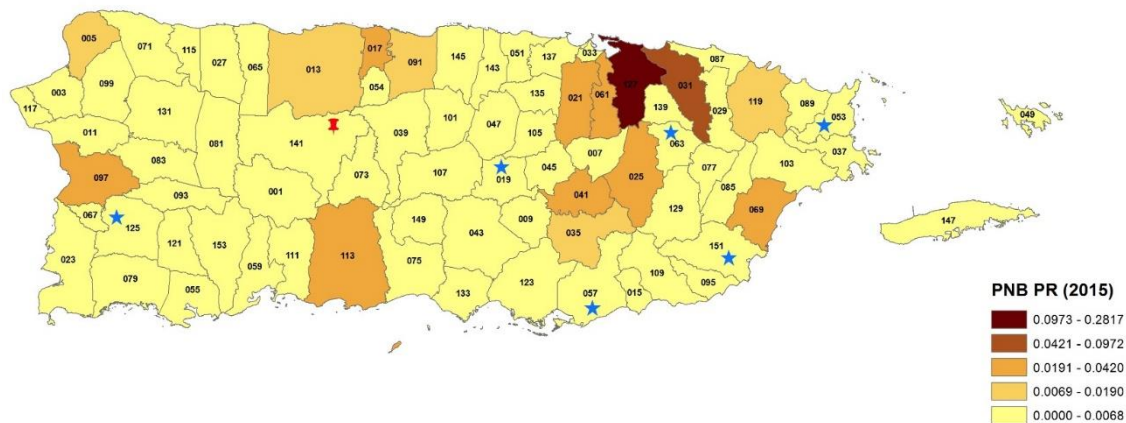
**Figure 5. Child Poverty Rate by County, 2011-2015**



Source: Census Information Center (2017)<sup>6</sup>

One potential cause for this type of poverty distribution is the geography of economic activity in the Island. In Figure 6 we can observe that the bulk of GNP is being made in a few counties, especially in San Juan (darkest county) and surrounding municipalities.<sup>7</sup> Thus, the farther one lives from these poles, the lower the access to economic opportunities, and the higher the poverty.

**Figure 6. GNP by Counties in Puerto Rico, 2015**



Source: Carballo-Cueto (2017)

Hurricanes probably raised the poverty rate in Puerto Rico. In Table 1 we observed that before the hurricanes, Puerto Rico had almost 9% of their population in the brink of poverty. Given the decline in

<sup>6</sup> <http://portalwww.cayey.upr.edu/iii/PublicacionesCIC>

<sup>7</sup> Carballo-Cueto, Jose (2017). "How (not) to Estimate GDP at the Sub-State Level: the Usefulness of the Economic Census". The Review of Regional Studies, Vol. 47, No. 3, p. 289-308.

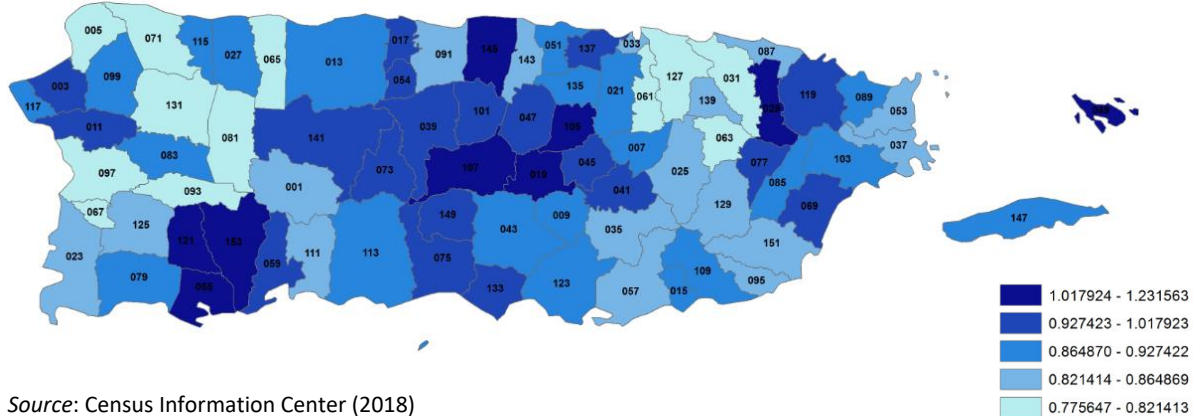
employment and the devastation, one could argue that the poverty rate was greater than 50% in the months that followed Maria.

**Table 1. Income Ratios with Respect to Poverty Level, 2016**

Ratios	Population	Percentages
Below 50%	805,412	23.80%
50% - 74%	342,191	10.10%
75% - 99%	321,779	9.50%
<b>100% - 124%</b>	<b>300,017</b>	<b>8.90%</b>
125% - 149%	254,905	7.50%
150% - 199%	417,097	12.30%
Over 200%	938,082	27.80%

Source: Census Information Center (2017)

**Figure 7. Ratio of households that filled an application to FEMA, 2018**



Source: Census Information Center (2018)

As of January 3<sup>rd</sup>, 1.09 million claims were filled with FEMA, representing 88% of Puerto Rican households. Figure 7 shows the most affected counties. Most of these applications were denied and only 0.1% received the maximum grant (\$33,000). Culebra (the small island on the right) had zero maximum grants for 543 claims; Hormigueros zero for 5,098; Quebradillas zero for 7,832; and Sabana Grande zero for 7,658 households affected. Lajas had one maximum grant for 7,484 claims and San German had one maximum grant for 10,207.

In terms of income inequality, Puerto Rico had one of the worst Gini coefficient in the world before Maria. In 2012 it ranked as the fifth most unequal country in the world with a Gini coefficient of 0.55, which increased from 0.535 in 2006. In the absence of redistribution, the hurricanes will probably exacerbate inequality: while there are some actors that will have more income by participating in the official reconstruction, others will not even have enough income to restore their primary asset (houses). A new fund for the most vulnerable population can be created with a temporary tax on the new incomes earned by reconstruction actors, but the local government has not established a procedure in that direction.

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## Economic Perspectives

Estimates contained in the official fiscal plan draft predict another economic collapse of 11% in fiscal year 2018, analogous to that reached recently by countries at war or suffering Ebola outbreaks. However, that official fiscal plan also forecasts an 8.4% real GNP growth for 2019, which would put Puerto Rico among the top four economies in terms of economic growth, exceeding world leaders such as China and India. Reconstruction would help some sectors, creating moderate growth of two or three percent because the effects of a disaster on a battered economy are not the same as in rich and growing economies.<sup>8</sup> Solomon Hsiang and Trevor Houser (2017) state that, "It could now take 26 years for the next generation to get back to where we are today, assuming that per capita growth rate would have continued...For Puerto Rico, Maria could be as economically costly as the 1997 Asian financial crisis was to Indonesia and Thailand and more than twice as damaging as the 1994 Peso Crisis was to Mexico — but this time on American soil."<sup>9</sup>

## Possible Solutions

In the aftermath of Maria, the U.S. media pressure in favor of Puerto Rico has no precedent. However, a few weeks after the catastrophe, the U.S. Congress approved a federal tax reform that included a new 12.5% tax on intangible assets made by U.S. corporations in foreign jurisdictions, including Puerto Rico. This could negatively affect the already weak economy of the Island, especially because half of its GNI is manufacturing. So far, the best action taken by the federal government to help Puerto Rico is a recently-approved reconstruction package for jurisdictions affected by hurricanes (Texas, Florida, Puerto Rico, and the U.S. Virgin Islands).

The U.S. government should take seriously their shared responsibility with the unfolding crises in its territories. Economic development tools such as removing cabotage laws, including Puerto Rico in the Guam-Northern Mariana Island Visa Waiver program, or establishing a Brady Plan to the Island are strong policies that could significantly help Puerto Rico without affecting the U.S. treasury.

The local government, on the other hand, should: keep the debt moratorium and focus on finding the debt sustainability to avoid second rounds of restructuring; diversify the destinations of exports beyond the U.S. and substitute imports; implement a local tax reform that reduces the island's relatively high economic inequality, eliminating rent-seeking behavior, and requiring the creation of jobs in the granting of subsidies; provide free counseling to local companies to improve their business and options to expand; allocate reconstruction spending (both private and public) for local businesses to increase the multiplier effect of the initial investment; reestablish fringe benefits for part-timers; audit the debt (there could be debt issued in violation of constitutional limits or fraudulently); formalize informal businesses; promote organic agriculture and the addition of value added to agricultural products (e.g., agroindustry), and move government agencies outside of the San Juan Metropolitan area to redistribute the economic geography, among others. Supply-side reforms have been established over the last 10 years with no significant impact. For instance, the government itself admitted that 300 jobs were created (0.03% total employment) after one year of a labor

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<sup>8</sup><https://publications.iadb.org/bitstream/handle/11319/3983/Ideas%20for%20Development%20in%20the%20Americas%2C%20Volume%2022%3A%20The%20Economics%20of%20Natural%20Disasters.pdf?sequence=2>

<sup>9</sup> Solomon Hsiang and Trevor Houser, *Don't let Puerto Rico fall into an Economic Abyss*, NEW YORK TIMES, (September 19<sup>th</sup>, 2017), <https://www.nytimes.com/2017/09/29/opinion/puerto-rico-hurricane-maria.html>



reform. Privatizations of many government assets and government downsizing have not yet brought economic growth at the time.

When making fiscal adjustments, policymakers should consider distribution aspects given the relatively high inequality.<sup>10</sup> In doing so, regressive taxes and subsidies should be avoided and austerity should follow a top-bottom approach: starting by capping salaries of all who earn \$100,000 (three times higher than the average wage) or more from government revenues, removing insurance companies as intermediaries in public health plans, and cutting professional services (e.g., the budget of the Agency for Public Private Partnerships increased by \$37 million this fiscal year). The time is appropriate for a deep government reengineering: by reducing redundant processes, savings are reached while public services improve. An austerity program limited to cuts is easier than reengineering but will not reap the best outcome for this society.

The local private sector should take better advantage of the opportunities and generate the jobs that are so badly needed to spawn inclusive growth. For example, many hotels in Puerto Rico were destroyed and some of them will not reopen. Remodeling those closed hotels and making them resistant to future natural disasters can generate adequate returns in the long term. Local producers can take advantage of the fact that more Puerto Ricans live stateside than on the island to create a solid commercial connection with the diaspora and start exporting. Another example is the retail market in Puerto Rico, which will continue to watch the departure of multinational retailers that need growing markets to meet the demands of their holding companies. These departures will open up opportunities for smaller-scale companies and for newly-formed entrepreneurial youth startups, which would generate greater multiplier effects on the gains that were previously repatriated.

It remains to be seen if, at the federal level as well as the local level, the correct economic policies are finally adopted.

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<sup>10</sup> IMF itself admits that inequality harms growth. <http://www.imf.org/en/publications/FM/Issues/2017/10/05/fiscal-monitor-october-2017>

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## Puerto Rico and the Jones Act

Mario Marazzi-Santiago\*

The Merchant Marine Act of 1920, also known as the Jones Act, is a U.S. federal statute that provides for the promotion and maintenance of the American merchant marine. In specific, it restricts traffic between U.S. ports (including Puerto Rico) to U.S.-flagged ships, constructed in the U.S., owned by U.S. citizens, and crewed by U.S. citizens or permanent residents. The merchant marine of the U.S. is one of the most expensive in the world.

Traditionally, the effects of this protectionism has been largely limited to areas in the non-continental United States that depend on the U.S. merchant marine, like Alaska, Hawaii, Puerto Rico, and other island territories. In fact, opposition to the Merchant Marine Act from non-continental policymakers has been common for many years. But, the merchant marine industry of the U.S., as well as labor unions, support the Act.

In 2016, 55% of Puerto Rico's merchandise imports were shipments from the U.S., and 78% of its merchandise exports were shipments from Puerto Rico to the U.S. A majority of Puerto Rico's merchandise trade takes place under the Jones Act, in both directions. Ultimately, Puerto Rican consumers pay higher prices, and Puerto Rican exporters to the U.S. are at a competitive disadvantage.

Can the Cost-of-Living-Index (COLI) of the Council for Community and Economic Research shed some light on these issues? The COLI is the principal source of data to compare the relative cost-of-living amongst 300 cities and urban areas of the United States and Puerto Rico. It has been published since 1968, based on a basket of just 57 goods and services. In 2014, the [Puerto Rico Institute of Statistics](#) worked to have the San Juan, PR Metropolitan Statistical Area (MSA) included in the COLI.

For the first time, it was possible to compare the cost-of-living in Puerto Rico with other places in the United States. For the third quarter of 2014, we found that supermarket items, which are typically imported from the mainland on Jones Act carriers, were 23% higher than the average in the United States. Utilities prices, particularly electricity prices, were 85% higher than the average. People in the San Juan, PR MSA were paying the highest prices for Iceberg lettuce and Parkay margarine in all of the United States.

While the San Juan, PR MSA ranked as the 41th most expensive area, out of about 300 geographic areas in the United States, other areas that could be affected by the Jones Act, like in Hawaii and in Alaska, also had a relatively high COLI. While these data are consistent with a Jones Act price effect, it certainly isn't conclusive.

Much more research is needed to tease out distance effects from a Jones Act effect. Non-continental areas are typically isolated, hard-to-reach, and have relatively high transportation costs, which may also explain the relatively higher COLI. The passing of Hurricanes Irma and Maria over Puerto Rico in September 2017, and the resulting logistical disruptions in Puerto Rico, have brought a renewed interest in reevaluating the effects of the Jones Act.

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\* Mario Marazzi-Santiago is the Executive Director of the Puerto Rico Institute of Statistics

At the same time, Puerto Rico is facing an economic and fiscal crisis of unprecedented magnitude. In 2017, the Government filed the largest bankruptcy in the history of the U.S. municipal bond markets, with some \$70 billion in unpayable debts and another \$50 billion in unfunded pension obligations. In addition, the Hurricanes caused an estimated \$90 billion in damages. In early 2018, a group of distinguished economists signed a [statement](#) calling for a fiscal plan in Puerto Rico that rejects the continuation of the policy of fiscal austerity in Puerto Rico.

Puerto Rico has already experienced over a decade of fiscal austerity measures, during which time there has been no economic growth, making it impossible for Puerto Rico to escape its recession. The resulting migration wave has been the largest in the history of Puerto Rico, even before the hurricanes. A new approach is necessary and the U.S. Government has an important role to play, not just, but also because of the devastation caused by the Hurricanes this past year.

The U.S. Government needs to reevaluate its policy towards its territories. Does the U.S. Government want its territories to have prosperous societies and economies? If so, there is a lot that it could do in the case of Puerto Rico.

## **Puerto Rico’s manufacturing decline, U.S. Possessions Corporations Taxes and Hurricane Maria**

Zadia M. Feliciano\*

A few months before Hurricane Maria landed in Puerto Rico as a category 4 storm on September 20<sup>th</sup> 2017, the government of Puerto Rico filed for bankruptcy similar to chapter 9 of the U.S. Bankruptcy Code (Scoria, and Gillers, 2017). Puerto Rico’s government owes more than \$74 billion dollars to creditors and 40 billion in pension liabilities (Farrant, 2017).<sup>1</sup> The effects of the Hurricane were devastating, with large losses of life, property and infrastructure. The recovery has been slow in part due to the financial constraints of the government. Six months after the hurricane, a large number of residents and businesses are still without power, and hospitals are suffering supplies shortages (Zwillich, 2018). The roots of the economic crisis in Puerto Rico have been linked in part to a large decline in the manufacturing industry, precipitated by the phase out and elimination of Internal Revenue Service (IRS) Section 936 tax exemption for U.S. corporations between 1995 and 2005 (Krueger, Anne O., Ranjit Teja and Andrew Wolf, 2015).

### **IRS Section 936**

U.S. corporations doing business in Puerto Rico received tax exemptions since the Revenue Act of 1921. However, over time the benefits given to U.S. corporations diminished. IRS Section 936 was created by the Tax Reform Act of 1976 to promote investments by U.S. corporations in U.S. territories, to increase employment and economic activity in U.S. Possessions. Under Section 936, U.S. corporations received full credit from income resulting from the conduct of trade or business in a U.S. possession. The Tax Equity and Fiscal Responsibility Act of 1982 and the Tax Reform Act of 1986 created restrictions on tax exemption for U.S. possessions corporations. To receive tax exemption, corporations doing business in a U.S. possession had to meet a direct labor or value-added test with respect to a specific product or service produced. The percentage of gross income that a corporation had to earn from trade or business in a U.S. possession was increased from 65 to 75 percent in 1986 (Holik, 2009).

Congress eliminated Section 936 in part due to the view that the job creating benefits of the program did not justify the U.S. loss of tax revenue. Moreover, many Section 936 corporations shifted intangible assets to the island to increase the amount of income that would qualify for tax exemption (Hexner and Jenkins, 1995). The Small Business and Job Protection Act of 1996 eliminated Section 936 tax exemption for U.S. possessions corporations beginning on tax years after December 31<sup>st</sup>, 1995. U.S. corporations already conducting business in a U.S. possession were allowed to continue getting tax exemption for years 1995 to 2005 (Holik, 2009).

While the benefits from Section 936 applied to all territories, most U.S. possessions corporations are located in Puerto Rico. In 2005, 98.8% of the 0.9 billion dollars in tax credits awarded under Section 936 were given to U.S. possessions corporations located in Puerto Rico. Most of these corporations were engaged in manufacturing. The manufacturing industry received 69% of the tax credits (Holik, 2009).

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<sup>1</sup> The Title III process, Puerto Rico Oversight, Management and Economic Stability Act (PROMESA), established a seven-person Oversight Board, appointed by the U.S. Congress to work with Puerto Rico’s creditors to renegotiate the island’s debts.

## Puerto Rico's Manufacturing Industry

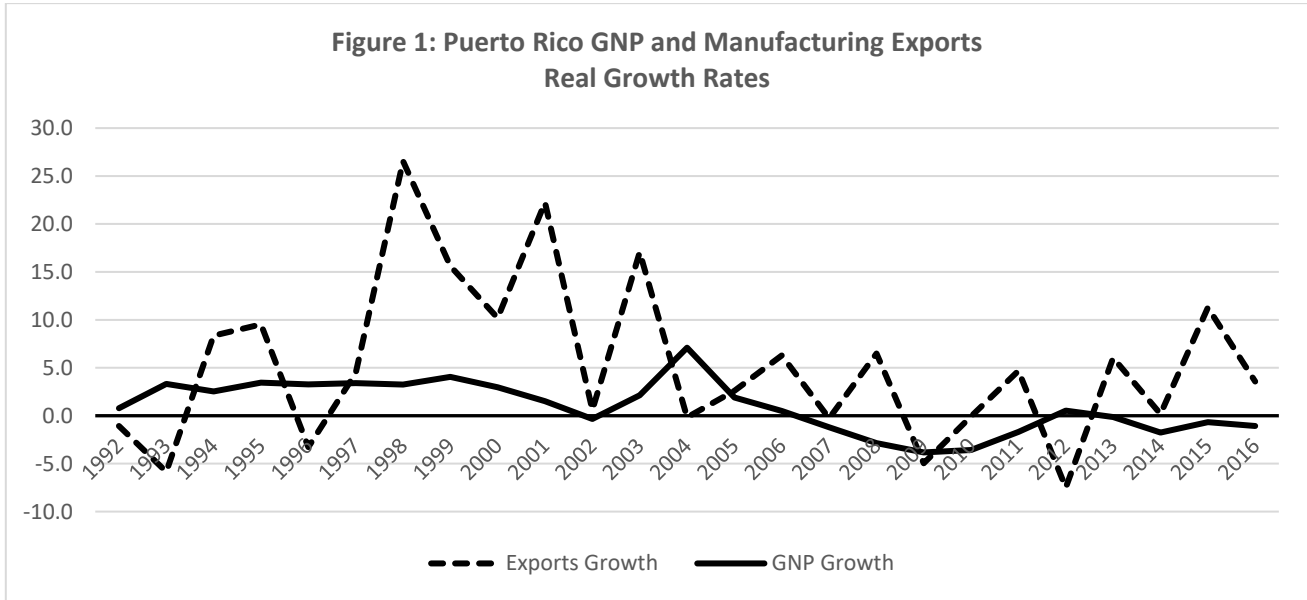
Table 1 shows the industry classification of U.S. corporations taking advantage of Section 936. Approximately half of the tax credits went to corporations in the chemicals and allied products, mainly in the pharmaceutical industry. The second largest industry located in Puerto Rico under Section 936 was the electrical and electronic equipment industry, accounting for 22.48% of Section 936 returns.

**Table 1: Section 936 Corporations, 1993**

	Number of 936 returns	Percent of 936 returns	Percent of 936 Tax Credits
Chemicals and allied products	88	23.91	49.85
Electrical and electronic equipment	46	12.5	22.48
Food and kindred products	27	7.34	12.58
Instruments and related products	41	11.14	9.5
Apparels and other textile products	49	13.32	1.73
Other Manufacturing Industries	117	31.81	3.85
Total	368	100	100

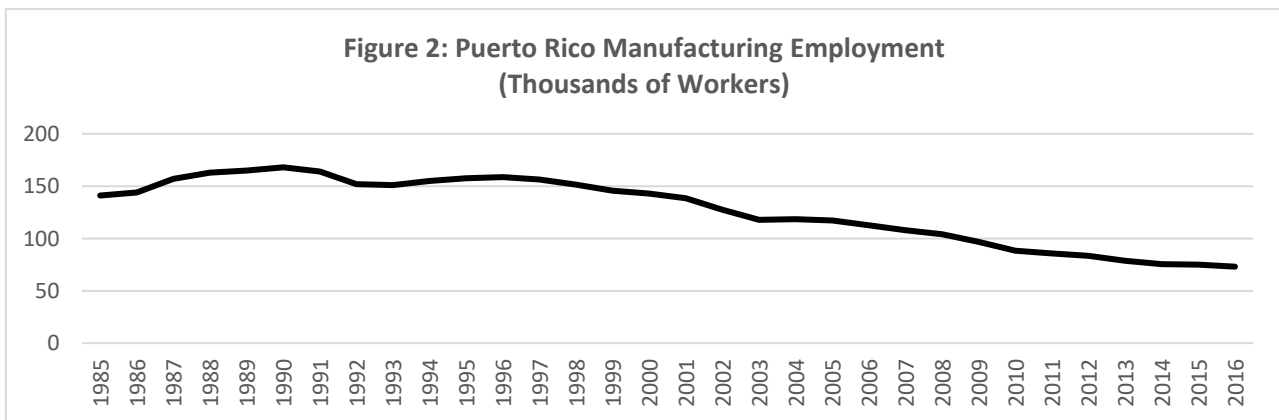
Source: U.S. Possessions Corporations, Statistics of Income, U.S. Internal Revenue Service, 2005.

Figure 1 shows real growth rates of Puerto Rico's GNP and manufacturing exports. Puerto Rico's GNP declined every year between 2006 and 2016, with the exception of 2006 and 2012 when the growth rate was 0.5%. GNP grew at an average annual rate of 3.0% between 1995 and 2005 and plummeted to an average annual rate of -1.4% between 2006 and 2016. The drop in GNP began after the elimination of IRS Section 936 in 2005. Manufacturing exports, which accounted for approximately 75% of total Puerto Rico exports in 2016, show similar declines. On average, exports grew at an annual growth rate of 10.3% between 1995 and 2005 but declined to an average growth rate of 2.3% between 2006 and 2016. Figure 1 shows GNP and exports indexes moved in similar directions, although fluctuations in exports were higher.



Source: Puerto Rico Planning Board, Economic Report to the Governor

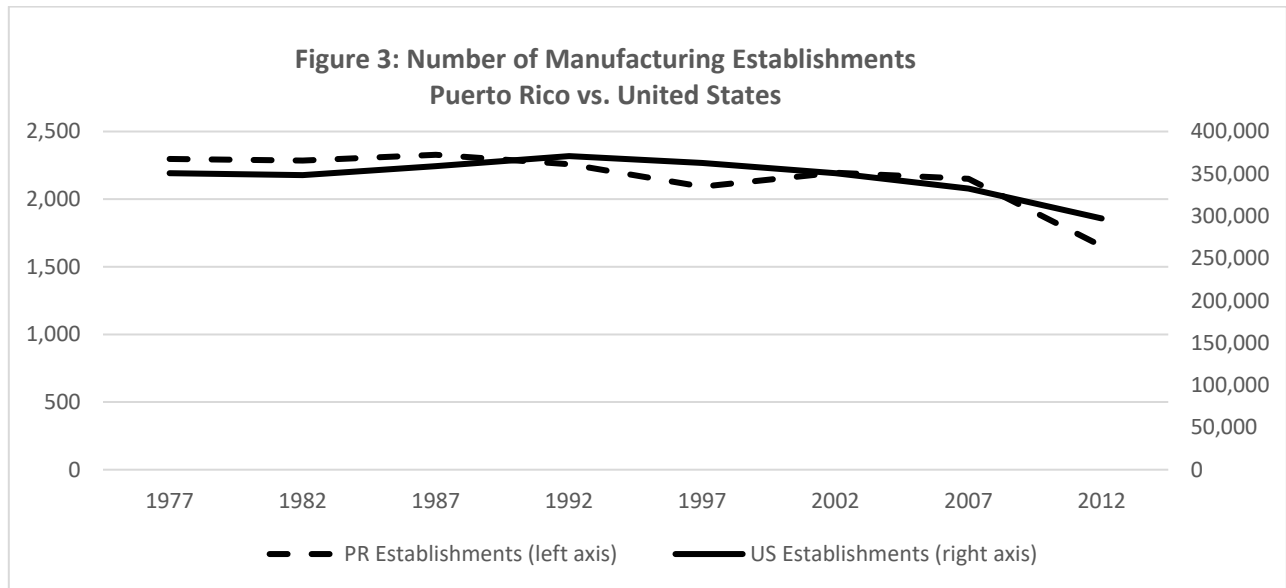
Manufacturing employment in Puerto Rico peaked before the phase-out and elimination of Section 936. Figure 2 shows employment in manufacturing from 1985 to 2016. Manufacturing employment peaked in 1990 at 168,000 and has declined since that year. However, the decline accelerated after the elimination of IRS Section 936. From 1995 to 2005 the number of manufacturing workers declined at an annual average rate of -2.5%. Between 2006 and 2016 the number of manufacturing workers declined at an average rate of -4.2%. In 2016 there were 73,100 manufacturing workers.



Source: Puerto Rico Planning Board, Economic Report to the Governor

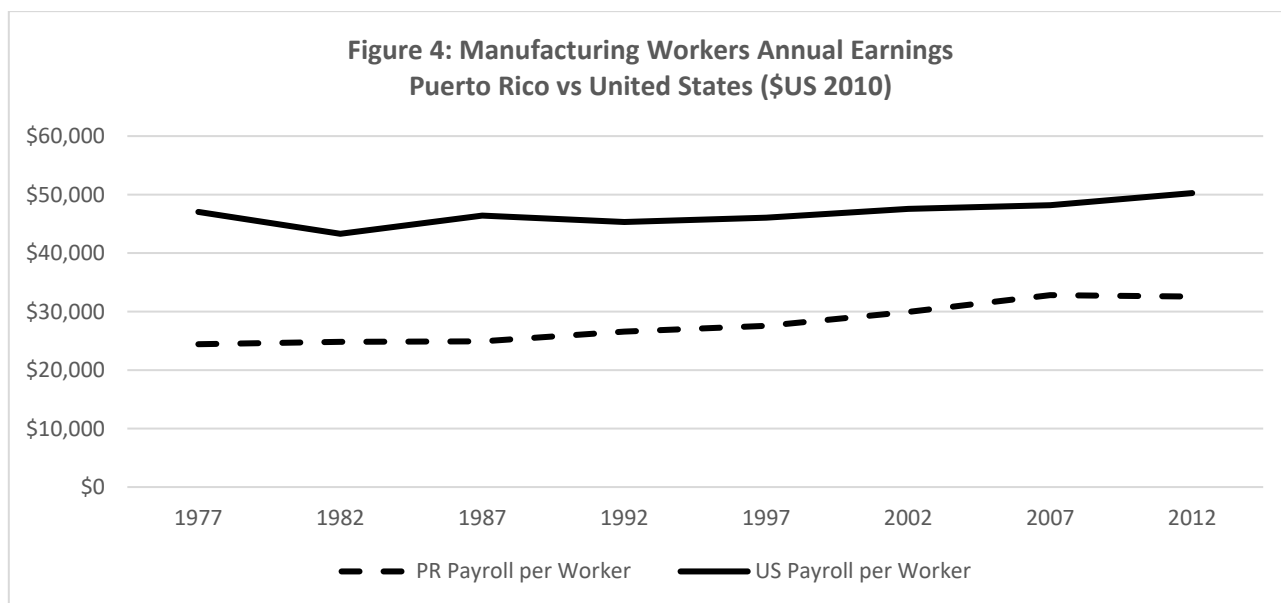
Figure 3 shows the number of manufacturing establishments in Puerto Rico and the United States from 1977 to 2012 from the U.S. Economic Census of Outlying Areas and the U.S. Economic Census. The number of manufacturing establishments peaked in Puerto Rico in 1987, at 2,328 establishments and peaked in the United States mainland in 1992, at 370,912. From 1977 to 2012, the numbers of manufacturing establishments decreased in Puerto Rico by 28.0%. During the same period, the numbers of manufacturing

establishments decreased in the U.S. mainland by 15.3%. This is evidence that the decline in manufacturing in Puerto Rico has been more severe than in the U.S. mainland.



Source: U.S. Economic Census of Outlying Areas and U.S. Economic Census

Figure 4 shows annual earnings of manufacturing workers in Puerto Rico and the United States from 1977 to 2012 from the U.S. Economic Census of Outlying Areas and the U.S. Economic Census. Earnings are shown in 2010 constant dollars. The figure indicates that Puerto Rico's workers have substantially lower earnings than those in the United States mainland. In 2012, Puerto Rican workers annual earnings were \$32,570 while those of workers in the United States mainland were \$50,256. Thus, Puerto Rican workers earned 35% less than workers in the United States mainland. Moreover, while annual earnings grew in Puerto Rico relative to the United States for most years between 1977 and 2007, the gap in earnings widened between 2007 and 2012.



Source: U.S. Economic Census of Outlying Areas and U.S. Economic Census

In previous research with Andrew Green (2017), we estimate the impact of the elimination of IRS Section 936 using a difference in difference methodology, where Puerto Rico is the experimental group and the United States is the control group. During the period from 1982 to 2012, Puerto Rico experienced the treatment of the elimination of IRS Section 936 tax exemption for U.S. possessions corporations while the U.S. did not experience any major change in corporate taxes. Using industry panel data, compiled from the IRS Statistics of Income for U.S. Possessions Corporations, the U.S. Economic Census for Outlying Areas, and the mainland U.S. Economic Census, we analyze the effects of the phase out and elimination of Section 936 on the number of establishments, value added, employment, and wages in Puerto Rico’s manufacturing. Our results show the elimination of Section 936 had the effect of decreasing average manufacturing wages in Puerto Rico by 16.7% relative to the U.S. mainland. We did not find a significant impact of Section 936 on the number of manufacturing establishments in the island when the U.S. mainland was used as a control. However, we estimated that the number of manufacturing establishments decreased by 18.7% to 28.0% as a result of the phase-out and elimination of IRS Section 936 when the control group is comprised of the states of Indiana, North Carolina and Oregon. When New Jersey was added to the control group of states the estimates do not show a significant impact on the number of establishments. We argue that New Jersey is not a good control for Puerto Rico due to its high wages.

### Manufacturing After Hurricane Maria

When Hurricane Maria landed in Puerto Rico, the manufacturing industry was already in decline due to the elimination of IRS Section 936. The Hurricane brought further harm to the industry by increasing the cost of doing business in the island due to infrastructure damage and the long recovery, especially the lack of access to electric power. Baxter International Inc., a major manufacturer of intravenous fluids and bags with manufacturing establishments in Puerto Rico, experienced large disruptions in production after Hurricane Maria. This led to shortages of these products in U.S. mainland hospitals (Caputo, 2017). According to a Baxter news release, sales in the first quarter of 2018 will be negatively impacted by approximately \$25 million (Baxter, 2018).



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## Conclusion

Prospects for the manufacturing industry in Puerto Rico are uncertain. The cost of doing business in the island has increased significantly due to the elimination of IRS Section 936. The effects of the elimination of tax exemption for U.S. corporations can be observed through the decline in manufacturing exports, decrease in manufacturing establishments and annual earnings of manufacturing workers. Future policy towards the island of Puerto Rico should address the need for increasing investment from U.S. corporations in manufacturing and services. These investments are necessary for the economic recovery of the island.

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## Puerto Rican Island-Mainland and Interstate Migration during La Crisis Boricua

Marie T. Mora, Alberto Dávila, and Havidán Rodríguez \*

More than half a year after Hurricane Maria brought catastrophic devastation and destruction to Puerto Rico, nearly 100,000 American citizens on the island continue to live without electricity and tens of thousands lack running water. However, Maria's devastating impact on Puerto Rico on September 20, 2017 came at a time when the island was already confronting a humanitarian crisis and a massive population exodus after nearly 12 years of a crippling economic crisis – La Crisis Boricua.<sup>1</sup> This crisis, which began in 2006 after a series of events came together to produce a “perfect storm”,<sup>2</sup> led to the largest number of estimated net outmigrants from the island on record. We estimate that 556,000 net migrants moved to the U.S. mainland and another 163,000 moved to foreign countries between 2006 and mid-2017,<sup>3</sup> leaving behind a shrinking and rapidly aging population in Puerto Rico. La Crisis Boricua further resulted in (and was also exacerbated by) a significant loss of industry and jobs in both the private and public sector; an overstretched healthcare sector; \$74 billion in debt described as “unpayable” and another \$49 billion in unfunded pensions; an external Oversight Board (created by the Puerto Rico Oversight, Management, and Economic Stability Act (PROMESA)) which has the final say over the island's finances without accountability to the Puerto Rican people; among other issues.

The magnitude of this exodus (Pre-Maria) represented nearly one in five (18.3 percent) of the island's 2006 population, making it the second largest net outmigration on a relative scale (the largest being during the Great Migration in the 1950s) (MDR 2017a, 2018). In addition to the traditional gateway areas such as New York, Puerto Ricans moved in large numbers to non-traditional areas such as Florida (which we refer to as an “old new” destination, as it began emerging as a major destination in the late 1970s and 1980s (e.g., Silver 2010)) and Texas. In fact, Florida received a full one-third of the incoming migrants from the island between 2006 and 2016, followed by Pennsylvania, New York, Texas, Massachusetts, New Jersey, and Connecticut.<sup>4</sup>

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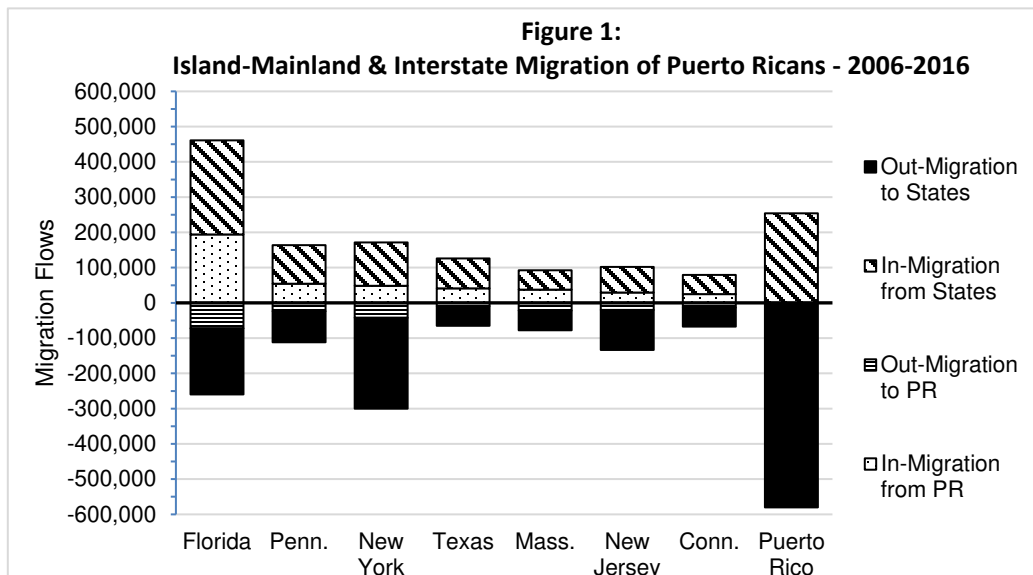
<sup>1</sup> Much of this article is based on selected findings from our recent book and related studies (e.g., Mora, Dávila, and Rodríguez (MDR) 2017a, 2017b, 2018); where possible, we provide updated estimates here. The views expressed in this article are the authors and not necessarily those of their respective institutions.

<sup>2</sup> See MDR (2017a, 2017b) for more details, and for a brief summary, see MDR (2016). One of these events was the complete expiration of Section 936 of the IRS Code in 2006, which provided tax breaks for U.S. corporations operating on the island. These were phased out between 1996 and December 31, 2005, causing many companies on the island to scale back or leave altogether, thus resulting in a significant loss in private-sector jobs, tax revenue (hence, a loss of public sector jobs), and bank deposits (e.g., MDR 2016, 2017a, 2017b, 2018; Caraballo-Cueto and Lara 2016).

<sup>3</sup> It should be noted that these estimates of net migrants include both Puerto Ricans and non-Puerto Ricans. The analyses below focus on individuals who self-identify as Puerto Rican.

<sup>4</sup> In our book (MDR 2017a), we discuss how Texas was the fifth largest receiving area of migrants from the island between 2006 and 2015; however, when including data from 2016, Texas moved ahead of Massachusetts to become the fourth largest destination of migrants from Puerto Rico (MDR 2018).

At the same time, it is worth noting that the Puerto Rican diaspora during this time extended far beyond migration from the island to the mainland (and other countries). Considerable interstate migration also occurred, resulting in an increasingly dispersed Puerto Rican population on the mainland (MDR 2017a, 2017b). For insight into the scale of migration, Figure 1 displays the island-mainland and interstate migration inflows and outflows of Puerto Ricans for the largest receiving areas between 2006 and 2016.<sup>5</sup> The two middle portions of the bar charts show the island-mainland migration flows and the top and bottom portions show the interstate components. This figure indicates that pre-Maria, the interstate migration flows exceeded the island-mainland flows. However, we expect that a sizeable number of interstate migrants had initially migrated from the island and later moved to other states from their initial gateway destinations, and others likely moved between states multiple times. It follows that the total migration flows in Figure 1 are not comprised of unique individuals and instead reflect the total number of moves (i.e., from both one-time migrants as well as migrants who moved multiple times) from/to the island and across state lines between 2006 and 2016.



Source: Authors' estimates using 2006-2016 ACS and PRCS data in the IPUMS.

Notes: These estimates are only for individuals self-identified as Puerto Rican. The migration flows (based on the location of residence 12 months prior to the survey) are not restricted to the seven states shown.

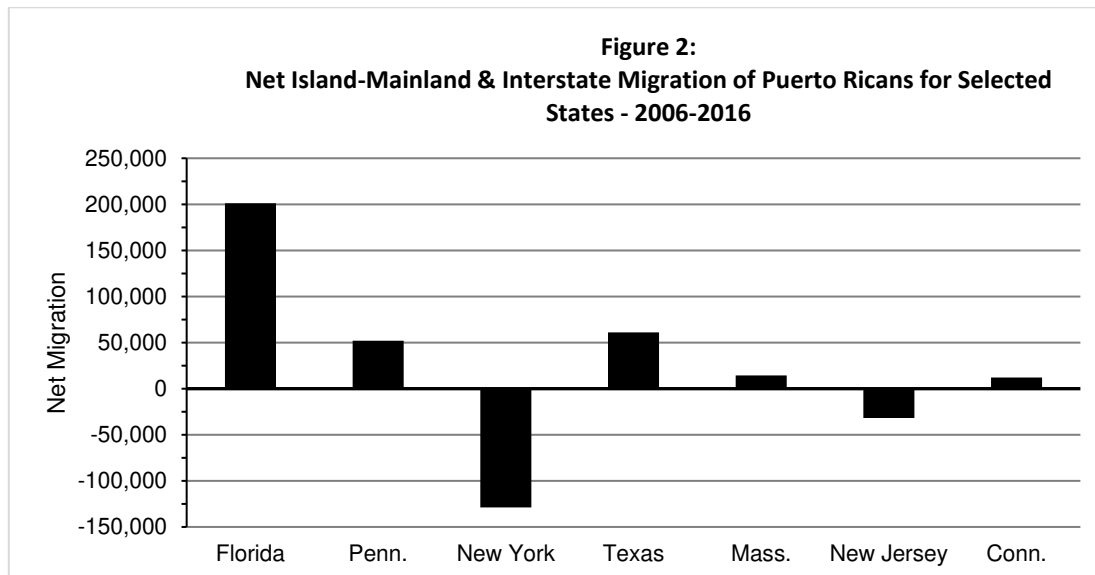
Figure 1 presents several interesting outcomes.<sup>6</sup> First, while outmigration from Puerto Rico to the mainland dwarfed in-migration to the island, technically Puerto Rico received more incoming Puerto Rican migrants from the states than any single state received from the island. As such, Puerto Rico represents the largest receiving area of migrants in the island-mainland migration flow during La Crisis Boricua, at least before Hurricane Maria. Second, Florida received considerably more Puerto Rican migrants from both the island

<sup>5</sup> We estimate these flows using public microdata from the 2006-2016 American Community Surveys (ACS) and Puerto Rican Community Surveys (PRCS) made available by Ruggles et al. (2017) in the Integrated Public Use Microdata Series (IPUMS). We identify island-mainland and interstate migrants based on the state (or area) of residence 12 months prior to the survey.

<sup>6</sup> We provide a more detailed discussion behind island-mainland and interstate migration of Puerto Ricans in our book (MDR 2017a).

and from other states than any other area. Third, while New York was the second largest receiving area of migrants from Puerto Rico plus other states combined, it represented the largest sending area of Puerto Ricans to other areas. That is, more Puerto Ricans left New York than those who moved in. This was not the case for Florida; while it was the largest sending state to Puerto Rico and second largest sending state to the rest of the mainland, the outmigration was relatively small compared to the in-migration. Such changes at least partly explain why the number of Puerto Ricans living in Florida is now about the same as the number who live in New York (1.1 million in each state).

For ease of visualization, Figure 2 shows the *net* island-mainland plus interstate migration flows of Puerto Ricans between 2006 and 2016 for the largest receiving states. Florida’s dominance as a net receiver of Puerto Rican migrants is again made clear (which received 201,000 net migrants), as is the loss of Puerto Ricans (nearly 129,000) in New York due to net outmigration. Moreover, this figure indicates that while Texas was the fourth largest receiving area of migrants from the island during this time, given its relatively small outflow to the island and other states, it ranked second in terms of net migration of Puerto Ricans (over 61,000). Note that Pennsylvania ranked third (which received nearly 52,000 Puerto Rican migrants on net), followed by Massachusetts and Connecticut (which received 14,000 and 12,000, respectively). Although on a smaller scale, New Jersey also experienced negative net migration of Puerto Ricans. It follows that less traditional settlement areas for Puerto Ricans have increased in prominence in terms of their geographic distribution in a short period of time.



Source: Authors’ estimates using 2006-2016 ACS and PRCS data in the IPUMS.

Notes: These estimates are only for individuals self-identified as Puerto Rican. The net migration flows (based on the location of residence 12 months prior to the survey) are not restricted to the seven states shown; these reflect the number of incoming migrants from Puerto Rico and other states minus the number of outgoing migrants to Puerto Rico and other states between 2006 and 2016.

In light of such changes, it is not surprising that the Puerto Rican population on the mainland has become increasingly dispersed (e.g., MDR 2017a). One measure of this dispersion can be found in Table 1, which presents the Herfindahl–Hirschman Index (HHI) of the geographic distribution of Puerto Ricans on the

mainland in 2006 (the year La Crisis Boricua got underway) and 2016 (the most recent year of data we have to identify Puerto Ricans). The HHI, which ranges from zero to one, is a metric of the concentration of a given population; the closer the index is to one, the greater the level of concentration. To obtain the HHI, we first estimated the share of the stateside Puerto Rican population that resided in each state or DC; we then squared these shares and summed them across the states. For comparison, we also provide the corresponding HHI for Mexican American and Cuban populations.

As we previously observed (MDR 2017a), Puerto Ricans are more geographically dispersed than the other two Hispanic groups. Table 1 indicates this was particularly the case in 2016. That year, the HHI for Puerto Ricans of 0.106 was approximately half of the one for Mexican Americans (0.200) and less than one-fourth of the one for Cubans (0.460).

**Table 1: HHI for the State of Residence of Puerto Ricans, Mexican Americans, and Cubans in 2006 and 2016**

Characteristic	Puerto Ricans		Mexican Americans		Cubans	
	2006	2016	2006	2016	2006	2016
Herfindahl–Hirschman Index	0.131	0.106	0.217	0.200	0.493	0.460
Equivalent number of states	7.6	9.4	4.6	5.0	2.0	2.2

Source: Authors’ estimates using 2006 and 2016 ACS data in the IPUMS.

Notes: Hispanic ethnicity is self-identified. The estimates only include U.S. states plus DC.

As we discuss in our book, a more intuitive way to interpret the HHI is through its inverse, also shown in Table 1, which reflects the equivalent number of communities (in this case, states) in which a population resides. If a population was evenly distributed across all 50 states and DC, the inverse of the HHI would equal 51. If it were to equal one, the population would essentially be residing in one state alone.

Table 1 shows that the equivalent number of states in which Puerto Ricans resided was 7.6 states in 2006, compared to 4.6 for Mexican Americans and only two for Cubans. While all groups experienced an increase (albeit only slight among Cubans) by 2016, Puerto Ricans experienced a greater absolute and relative increase in their inverse HHI than the other two groups shown, affirming that their geographic dispersion continued as La Crisis Boricua deepened. This change also led to a widening gap of the inverse HHIs between Puerto Ricans and Mexican Americans and Cubans between 2006 and 2016. To illustrate, the equivalent number of mainland states in which Puerto Ricans increased from 7.6 to 9.4 states during the decade; the corresponding numbers rose from 4.6 to 5.0 among Mexican Americans and from 2.0 to 2.2 among Cubans.

These changes indicate that policymakers and social workers considering ways to ease the transition and integrate new Puerto Rican migrants into their communities should be cognizant of their increased dispersion, even in communities in which few Puerto Ricans have traditionally resided. Still, as we caution in our book, due to distinct differences in their socioeconomic characteristics and outcomes across the major destination areas, a “one size fits all” approach might not be the optimal solution. This is likely to be of acute importance as large numbers of post-Maria Puerto Rican migrants continue to move from the island into new and traditional gateway areas on the mainland.

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